

The Dock and Harbour Authority

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Editorial Comments

A Sub-Arctic Port.

Reykjavik, the subject of an article in this issue, has a point in common with Tipperary—that "its a long, long way to go." Not perhaps in mere mileage; there are ports much more distant from Great Britain on the other side of the world. But Iceland is so far off the main track, so remote across a waste of stormy seas, fog and bitter cold, that a journey to that part of the earth's surface is an undertaking not very tempting to most people. Yet, on arrival at his destination, there are agreeable surprises for the venturesome traveller. The country, though bare and wild, has yet a charm of its own and, in summer, exhibits a geniality which is quite unexpected. The inhabitants, too, are a sturdy race with many good qualities, not the least of which is their linguistic ability, for they have a high standard of education.

Considered as a port, Reykjavik, has no pretensions to the front rank. But it has a fine, natural harbour, much improved by artificial works, and eminently suitable for the class of shipping which visits it. The harbour management is both active and enterprising.

We have pleasant recollections of a brief visit to the island, marred only by one disappointment. Rugged mountain peaks, snowfields and glaciers were admired to the full, but when it came to a trip to an outstanding feature of the country—one of its celebrated geysers—there was an unfortunate hitch in the performance. According to the guide book, the Gryla Geyser should have erupted pretty regularly at two hour intervals. Although our stay at the site, which is marked by a stone slab with a small aperture, six inches or so in diameter, was prolonged beyond the limit of our patience, nothing happened and no jet issued from the orifice. We learned later that an eruption followed almost immediately after our departure, which unfortunately did not admit of further delay. We had to retrace the monotonous journey of 30 miles to Reykjavik along an extremely dusty road without the recompense of having seen the geyser in operation. However, we had ocular evidence of the possibility of its occurrence from the numerous vents of steam from the ground in the immediate vicinity and with that we had to be content.

It only remains to say that Iceland has attained some military significance in the present international conflict on account of its strategical position in the Atlantic. Following the occupation of Denmark by the Nazi forces, the island was taken over in June, 1939, by Great Britain for the duration of the war, in order to prevent its falling into enemy hands.

Centenary of the Port of Hong-Kong.

The 26th January, 1840, was the date of the foundation of the British Colony of Hong-Kong, and in connection with the Centenary celebrations last month, the late Lord Lloyd (then Colonial Secretary) whose unexpectedly sudden demise at the comparatively early age of 61 is greatly to be deplored, telegraphed to the Governor as follows:—

"The scene which, one hundred years ago, met the eyes of the small British landing party was that of a desolate, barren island. To-day, they would see a great port, with a flourishing commercial and administrative capital and a well-armed fortress. These achievements have been built on the firm and sure foundation of co-operation between the British and Chinese peoples. Hong-Kong cannot fail to wield a wide, powerful and growing influence in the Far East."

At the time of its cession to the British Government, the island of Hong-Kong, 11 miles long and 2 to 5 miles broad, with an area of about 32 square miles, was, in fact, a pirates' lair and little more than a barren rock, though it had a plentiful supply of good, fresh drinking water, as is indicated by its name, a corruption of Hiang Kiang, "streams of sweet waters." Ships were in the habit of calling at the place to replenish their supplies. Apart from this, it had no trade and scarcely any redeeming feature. It was infested with pestilence and fever for many years after the British occupation, and only a resolute determination on the part of the British Government overcame an agitation to abandon the settlement for some more favourable locality. In the end, perseverance, aided by scientific methods of sanitation and hygiene, overcame the difficulty, so that except for the drawback of its humid summer climate, Hong-Kong is definitely salubrious and, in every way, congenial to its British colonists.

Records of port trade in the early days of the colony are scanty, but from the columns of the first local newspaper published in 1857, it can be gathered that the largest ship visiting the port at that date was the P. & O. Company's s.s. *Ava* of 1,620 tons. This may be compared with vessels of more than 40,000 tons which have berthed at the port within recent years. Just before the war, an aggregate amount of 15½ million tons of shipping visited the port annually.

The harbour is capacious and well-sheltered, comprising an anchorage area of over 10 sq. miles, with depths ranging from 24-ft. to 78-ft. The only drawback is the prevalence at certain seasons of typhoons, or storms of great violence, with wind velocities approaching 100 miles per hour.

Articles on the port, its trade and its facilities have appeared in the issues of this Journal for May, 1926, and December, 1936. The former described the proposals of Mr. John Duncan, the harbour engineer, for the expansion of the port accommodation.

In August last year, Sir David Owen, formerly General Manager of the Port of London, was commissioned by the Government of Hong-Kong, through the Colonial Office, to investigate conditions at the port, with a view to formulating a scheme for its future working. As set out in our issue of September last, the terms of reference were: "To investigate the whole question of harbour facilities, organisation and administration at Hong-Kong, having regard to the existing system of pier leases, which are due to expire in about ten years' time, and, in the light of physical, economic and political conditions, to make recommendations for measures by which the Port could, in future, be developed and controlled to the best advantage of all persons and interests dependent on its services."

The Utilisation of the Canals.

It is welcome news that, at long last, there is an awakening in Government circles to a sense of the value of the canals of Great Britain for inland water transport, and collaterally for the relief of goods congestion at the ports. In reply to a question in the House of Commons Col. Moore-Brabazon, the Minister of Transport made the candid admission that he was gradually becoming "very barge-minded." He was not yet in a position to make a statement, but investigations had been going on "during the last few weeks." He was conscious of the fact that the canal system wanted "tuning up."

Editorial Comments—continued

We have italicised part of the Minister's declaration since it justifies us in asking quite pertinently, why the investigations, which ought to have been put in hand months and even years ago, have only just been undertaken, and what excuse there has been for neglecting a matter of such importance to the national economy in war-time. There is no need to go over the ground which has already, and indeed frequently, been covered in this Journal in advocating the fullest possible use of the country's water highways, especially when rail and road services are taxed, as at present, to the limit of their capacity.

One of the chief difficulties which presents itself is the shortage of skilled boatmen. At a recent meeting of canal owners and operators, it was stated that unless more boatmen became available, no increase in traffic would be possible. A scheme for training canal boatmen is reported to be under consideration by the Minister of Labour.

We trust that the investigations will not be unduly prolonged and that the Minister of Transport will be able to announce his intentions at an early date.

The latest announcement to hand as we go to press is that Mr. Frank Pick, formerly Vice-Chairman of the London Passenger Transport Board, has been appointed "to investigate and report upon the carriage of traffic on canals and inland waterways."

The Port of Benghazi.

The Libyan port of Benghazi has figured very prominently in the daily press during the past month and attention has been directed to the useful harbour accommodation, which, by its capture has been transferred to the service of the British Navy. An Editorial Comment in the issue of this Journal for November last gave some particulars of the port, to which may now be added the following details gleaned from several sources.

Situated on a narrow strip of land between the Gulf of Sidra and a salt marsh, the place is of very ancient origin. Its primary name, when founded by Greek colonists, was Hesperides, but this was altered to Berenice by Ptolemy II. of Egypt, in compliment to his wife. The present designation may possibly be a somewhat corrupt derivative of the latter. The old settlement has long since disappeared and is now buried, like so many other relics of ancient civilisation, in the shifting sands of the Libyan Desert.

The importance of Benghazi has developed only within the last twenty years or so. Prior thereto, it was merely an insignificant little port, quite shallow and easily silted up. Ships visiting it had to be in an open roadstead, subject, during winter to heavy seas from the North and North-west. Loading and discharging of cargo was done by means of shore boats and lighters. However, in 1935, the Italians at a cost of over £500,000, completed the construction of two outer breakwaters, enclosing an area of 370,000 sq. yards, which forms a capacious and sheltered harbour, accessible in all weathers to vessels of considerable tonnage, though there is only a restricted draught of 15-ft. alongside the interior mole or jetty. Within this limitation there are (or were, before British bombing operations) first-rate facilities for handling cargo and reasonable plant for executing repairs.

There is a cosmopolitan population of some 65,000 souls—Arabs, Greeks, Maltese and Levantines, in addition to Italian settlers. The city, which is modern and well laid out, is the capital and seat of government of the province of Cyrenaica. It is an important centre for the export of barley, sponges, hides and fish. Its industries include boot-making, the output of which reaches 100,000 pairs annually, and the processing of esparto grass.

Danzig and Gdynia.

Prior to the invasion of Poland and, indeed, as the chief, or, at any rate, the immediate *causa belli*, the German Government and press were eloquent over the supposed injustice suffered by the Port of Danzig, due to the supposed unfair competition of the Port of Gdynia, which was alleged to have been created by the Poles solely for the purpose of destroying the prosperity of the older Germanic port. Now that both ports have been for a considerable period under the single domination of the Reich, it was reasonably to be expected that the Germans would have a different tale to tell, as the result of their own administration of the ports. But, strange to say: not at all! Out of the mouths of their own supporters comes the astonishing admission that Danzig is no better off—in fact, is worse off under the present regime. The *Frankfurter Zeitung* states frankly that Danzig is suffering greatly from economic depression and does not conceal the fact that pre-war Polish Customs' policy was profitable alike to both ports. The commodity turnover of Danzig has seriously declined of late and Western Poland under German control is exporting its goods through Stettin, while timber from the Eastern (or Russian) provinces is despatched through Memel. By way of palliative for this uncomfortable state of affairs from the German point of view, the German Journal attaches great importance to the hope for a revival of trade between Germany and Russia. This aspiration may, or may not, be realised.

The Shipping Outlook.

One of the chief pre-occupations of the British Government at the present time is the maintenance and replenishment of the mercantile marine, and the necessity of making good the losses inflicted on it, almost daily, as the result of enemy attack by mine, torpedo, bomb and gunfire. The casualty lists published from week to week show the tremendous inroads which have been made upon the available supply of shipping, which, apart from its normal duty of satisfying the needs of commerce, has also to meet, simultaneously, the demand for huge consignments of munitions of war to be conveyed to and from distant parts of the globe. During the seventeen months of hostilities to the end of January, the combined total of British, Allied and Neutral losses was, in round figures, 4½ millions gross tons, that is, about 6½ per cent. of the world's total tonnage—a truly formidable aggregate, which might well cause serious misgivings in the minds of those charged with the maintenance of the country's supply of foodstuffs and raw materials.

Returns showing the war-time capabilities of British shipyards are not available, but, in the past, the output of merchant shipping has varied within wide limits, ranging up to 2 million tons annually. This is appreciably below the loss at the rate of over 3 million tons indicated above. As some compensation, there is the possibility, perhaps we might even say the probability, of assistance from American yards. At the time of the previous great war, when America was an Allied Power, the output therefrom (including shipyards on the Great Lakes) under the stress of urgent necessity, rose in 1918 to over 3 million tons and, in the following year, to over 4 million tons. Since America is quite capable of reaching this figure again and, in all probability, of exceeding it, there is some ground for reassurance, if the resources of the United States are utilised to the full on behalf of Great Britain.

But, at the moment, America, however sympathetic, is still in the position of a neutral state, and the extent of the help she will be able and willing to give, can only be conjectured. The only vessels coming to this country from the United States at present are those registered under the Panama flag.

Clearly, then, there is every necessity for the utmost effort in British yards, if Hitler and his gang are to be baulked in their attempts to annihilate British shipping on the high seas. Plans to increase output and achieve greater speed and efficiency in the ship-building and ship-repairing industries are under discussion between the Minister of Labour, the employers and the unions. It is to be hoped that the outcome of the conferences now being held will be the production of merchant shipping commensurate with the needs of the situation.

The Dock and Harbour Authorities' Association.

The Annual General Meeting of the Dock and Harbour Authorities' Association is taking place at Liverpool on February 26th at a time when the March issue of this Journal is actually at press, so that we are precluded from giving any immediate account of the proceedings. However, through the courtesy of the Secretary we have received in advance, and are able to reproduce in this number, the Report of the Executive Committee for the preceding year. From this, it is to be gathered that the activities of the Association during the past twelve months, in which the normal procedure of port operation has been overshadowed by the progress of hostilities, have been largely directed to examining and regularising the effect of war-time legislation. Certain provisions of recent parliamentary bills have appreciably affected the powers of port authorities in the United Kingdom and it has been necessary to maintain a careful scrutiny and, in some instances to obtain a modification of the government proposals. Particularly has this been the case in reference to financial enactments, such as the Excess Profits Tax Finance Act and Government Control of Port Charges.

Retirement of Port Officials.

Recent changes in port personnel have included the following:—

With the close of the year 1940, Mr. F. S. Blunt retired from the post of Secretary to the Port of London Authority. Since the outbreak of the present war, he has also been Secretary to the London Port Emergency Committee. Mr. Blunt was formerly in the service of the old Thames Conservancy Board (one of the predecessors of the Port of London Authority) which he entered in 1902 and he held the position at one time of Treasurer to the Authority. Mr. F. W. Nunnerley has been appointed Acting Secretary in place of Mr. Blunt.

Another retirement announced at the end of last year, was that of Capt. Edwin William Harvey, who had been dockmaster at Southampton for the past 28 years. Prior to his Southampton appointment, he was Dockmaster at Avonmouth for 9 years. A Younger Brother of Trinity House, he is one of three original members of the Southampton Harbour Board, still serving. His successor in the dockmastership at Southampton is Capt. Percy Arthur Morgan, who has been assistant dockmaster there since 1933.

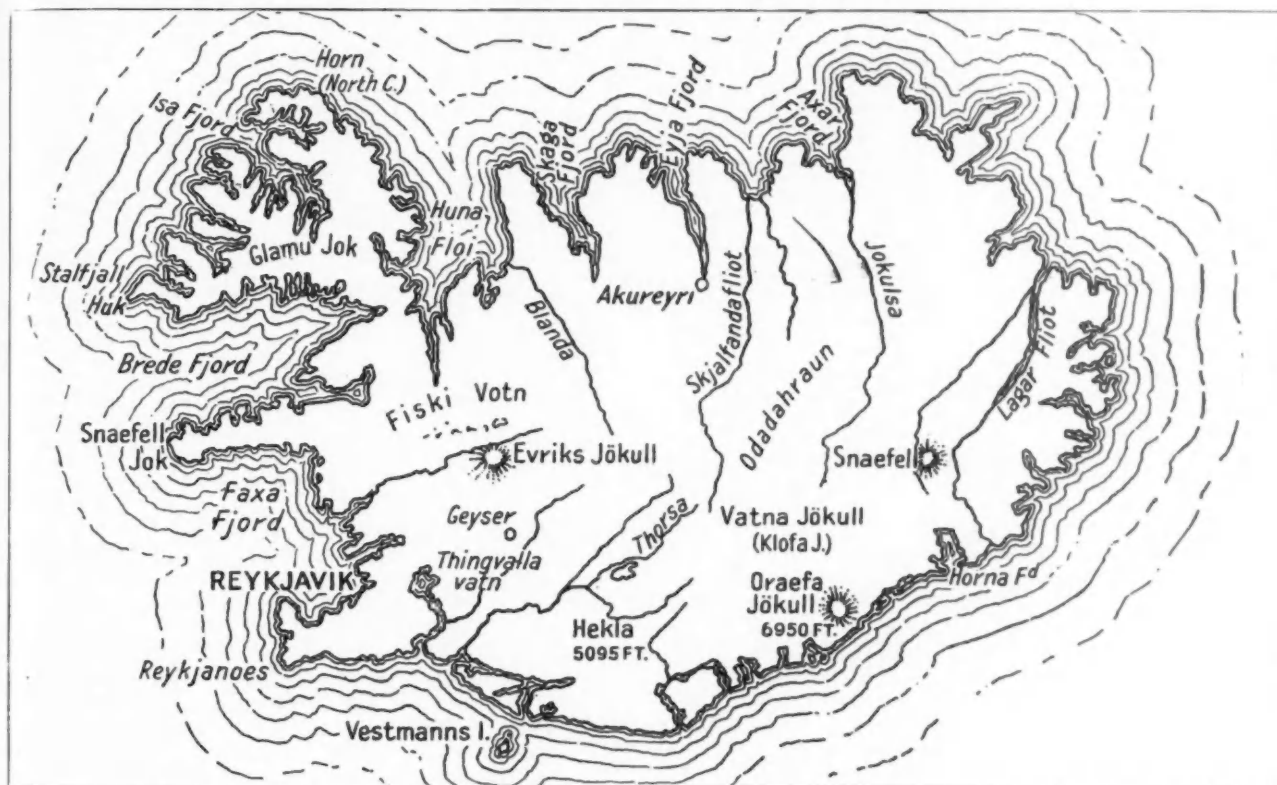
Iceland and its Port

A Commercial Outpost in Northern Latitudes

(CONTRIBUTED).

FAR out in the North Atlantic, on the very fringe of the Arctic Regions, remote from the main traffic routes of the seafaring world, lies an island rather larger than Ireland, with a name in keeping with its environment, but a little misleading as to its actual character. Iceland, as it is termed in English, though it is merely Island in Danish, is as much a misnomer as the name Greenland, of its nearest neighbour. Under the kindly influence of the Gulf Stream, the climate of the place is not nearly so harsh and severe as might be imagined from its name and situation. Indeed, during the summer months, the temperature is quite genial and the atmospheric conditions delightful. From May until August there is continuous daylight, and during June, the sun does not actually set in any part until

The landscape in the cultivated areas is chiefly remarkable for the absence of trees. The only members of the arboreal family are some dwarf birch, rarely exceeding 10 or 12-ft. in height, together with a certain quantity of stunted shrubs. Another remarkable fact is that there are scarcely any coal deposits, indicating that trees have never flourished to any extent in geological epochs. The lack of coal and timber for fuel is not felt so much as might be expected, since the inhabitants make full use of the hot springs and geysers, which abound, for the heating of greenhouses to raise plants which otherwise could not exist. Hot, almost boiling, water is obtainable for household laundry purposes from numbers of natural jets and from ground seepage in the vicinity of geysers.



Map of Iceland, showing position of Reykjavik.

within an hour of midnight. In the north of the island, which just touches the Arctic Circle, the sun never sinks below the horizon for a full fortnight.

In size, Iceland, as has been stated, most nearly approaches to Ireland. Its area of some 40,000 square miles is about 7,000 miles greater than that of the British island. The habitable part of the surface, however, does not exceed 16,200 square miles. The greatest length, from East to West, is about 300 miles and the greatest breadth, from North to South, 200 miles, forming, roughly, a serrated oval, with an excrescence at the North-West in the shape of a peninsula, connected with the mainland by an isthmus at its narrowest part only $4\frac{1}{2}$ miles wide. This isthmus, which has a height of 750-ft., divides the island into two plateaux of unequal area, but with a common altitude of about 2,000-ft. The geological formation is essentially volcanic. There are over one hundred volcanoes in existence at the present time, with thousands of craters, mostly low and not exceeding 500-ft. in height. One notable volcano, Hecla, about 5,000-ft. high, erupted violently as recently as the middle of last century. Generally, the island has a foundation of pelagonite or pelagonic tufa, on which have been superposed masses of basalt and mountains of trachyte and other volcanic material.

The coastline indentations develop a length of 3,730 miles, one-third of which total lies in the North-West peninsula.

The island is largely barren, or only mediocly productive. Some 13 per cent. of the surface consists of snow and icefields, and in the remainder there are large tracts of sand and pulverised lava. In the lower parts along the coast, there is a certain amount of marshland, affording good pasturage for sheep and cattle. A special breed of pony, small in size but very sturdy, is a notable export.

Lakes are numerous, the largest being Thingvallavatn and Thorsvatn, each just under 30 square miles in area.

The principal industries are fishing and the operations connected with curing, packing and forwarding abroad. These furnish employment for about a fifth of the population of 40,000. There are no railways. Transport and locomotion is chiefly by motor car, though it has to be admitted that the surfacing of the roads is not ideal for the purpose. Mainly constructed of lava, the roads give off great clouds of dust in dry weather and, in winter, they are apt to be particularly muddy.

As regards shipping and external trade, there is, in normal times, a steamer service to Denmark, calling at Leith and at Newcastle. A coastal service, visiting the small harbours in series, connects these with the capital.

The Port

Reykjavik (pronounced Reck-iavick) the capital of Iceland, with a population of about 37,000, is the chief and, in fact, the only port of any note. It is located in a coastal embayment forming part of the Faxe Fjord, at the South West corner of the island, behind the peninsula of Reykjanes and has a large and commodious harbour, artificially formed by enclosing breakwaters, with an entrance between pierheads from the west. Within the outer protective works are several semi-enclosures formed by projecting piers and jetties, alongside which there is convenient berthage for shipping. The depth at the harbour entrance at low water is about 20-ft., and alongside the quays 16-ft., but, as the tides have a rise of 16-ft. at springs and 10-ft. at neaps, the available draught is correspondingly increased at high water.

Recent harbour extension work has been carried out with the aid of hollow reinforced-concrete caissons, which have been

Iceland and its Port—continued

Aerial View of the Port and Harbour, Reykjavik.

moulded ashore, launched from a slipway, towed into position and sunk, being afterwards filled in solid. As there are no local sources of supply, Portland cement for the concrete work has had to be imported from Denmark.

Harbour deepening operations have been simultaneously in progress, the material dredged from the bottom, which consists of sand with an admixture of mud, being utilised for reclamation work.

The staple industry of Reykjavik, like that of the rest of the island, is fishing—mainly for cod and cod-like species, and, less importantly, for herring. The Icelandic fishing grounds are well known and attract trawlers from distant countries. A special class of vessel, called Icelanders, is fitted out in Great Britain for these voyages.

Apart from fishing, there is a considerable amount of sheep farming in the neighbourhood, as in the island generally. The main commodities exported are fish and fish products (cod-liver oil, etc.), wool and sheep. Imports consist mainly of salt, coal, grain, breadstuffs and timber.

The city is the seat of the Icelandic Government, which is under Danish control, but enjoys a large measure of independence definitely recognised by the parent country since 1928. A secretary for the local administration is resident in Copenhagen and formal approval of proposed legislation by the Al-thing (the Icelandic Parliament) is obtained through his agency.

The photographs accompanying this brief notice of a most interesting port and harbour have been kindly furnished by the Harbour Director, Mr. Kristjansson.

Goods Permit for Mersey Ports

With a view to relieving congestion and securing a more rapid turn-round of both railway wagons and road transport vehicles, Mr. J. Gibson Jarvie, the North Western Regional Port Director, has decided that as from March 1st, 1941, no goods shall be delivered for shipment at Liverpool or Birkenhead without a permit.

Under the new system, which has been designed to cause as little disturbance of the present practice as possible, Shipping Companies and Forwarding Agents will continue to advise their customers of prospective sailings as usual and shippers will inform the Shipping Company either direct or through their Forwarding Agents of their intention to ship goods. The usual particulars of the class of cargo, weight, measurement, etc., will be given.

In due course the Shipping Company will advise the Forwarding Agents, the Shippers, or their suppliers, that the goods can be received. For rail transport the date on which they will be received will be given; for road transport the date (and time, if a time is to be stipulated) will be stated. If goods are sent by road the permit must accompany the consignment and be handed to the Wharfinger at the Dock; if they are sent by rail the permit must be lodged with the Railway Agent at the forwarding station. Goods sent without permit, or otherwise than as the permit directs will not be accepted.

It will remain within the discretion of the Forwarding Agents, Shippers, or suppliers, whose duty it will be to see that these arrangements are implemented, to decide whether the goods should be sent forward by rail or road transport, but the general principles governing the issue of motor fuel rations will continue to apply and it remains important in the national interest that there should be no wasteful use of fuel.

It will greatly facilitate handling if the relative shipping note accompanies the goods or is sent on in advance.

Reasonable co-operation should result not only in the accelerated discharge and freer circulation of railway stock and the prompt unloading of goods vehicles, but should have repercussions on the clearance of imported goods and so serve a double purpose.

The Director is satisfied that the new system will be of undoubted benefit to all concerned and earnestly requests shipping companies, forwarding agents, shippers, railway companies and road hauliers alike to observe the conditions strictly and to do their full part towards making the scheme work smoothly and successfully.

PRO-FORMA.**PERMIT TO DELIVER GOODS FOR SHIPMENT AT LIVERPOOL AND BIRKENHEAD.**

Consignment
Destination Port
Please arrange for the above consignment to be delivered at Dock on
before.....m.

This permit must be sent with the consignment and produced to the Wharfinger at the Dock, if the goods are sent by road, or lodged with the Railway Agent at the Forwarding Station if the goods are sent by rail. The Shipping Note should accompany or precede the arrival of the goods.

CUSTOMS.

Shippers' instructions and suppliers' advices must indicate clearly whether the goods are:—

- | | |
|----------------------------|---------------------|
| (1) Licensed | (3) Non-Empire |
| (2) Under Bond or Drawback | (4) Non-Restricted. |

**GOODS SENT FORWARD WITHOUT THIS PERMIT
WILL BE REFUSED.**

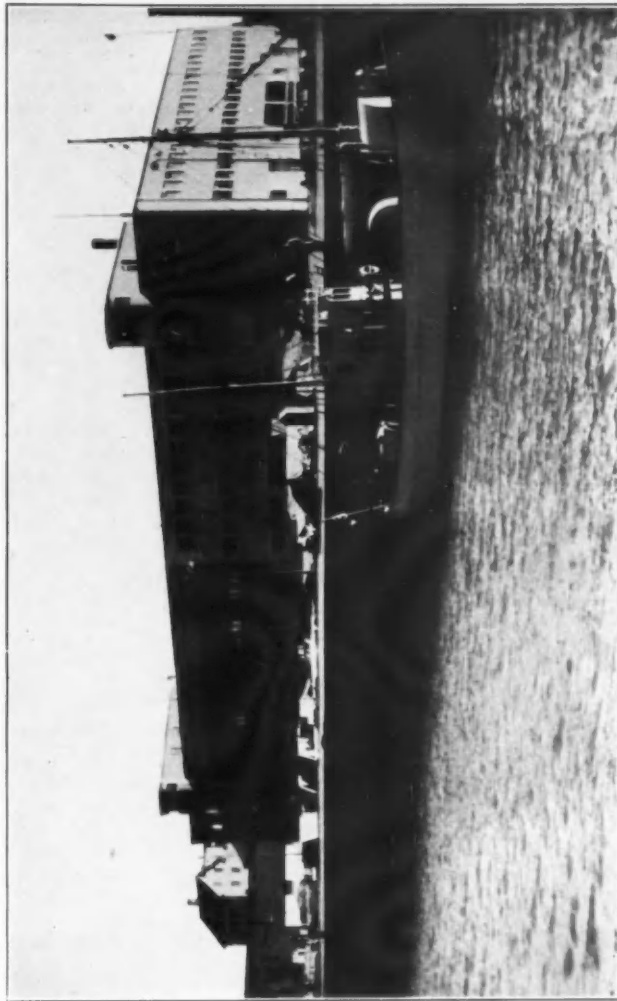
NOTE.—While at press, the following announcement has been received:—

For the convenience of Shipping Companies and in order to allow them time to adjust their methods to the Permit System outlined above, the Liverpool Port Emergency Committee, with the consent of the Regional Port Director, have agreed to postpone its introduction for a short period. Full details governing the operation of the new scheme are to be issued and the date of commencement notified in the Press.

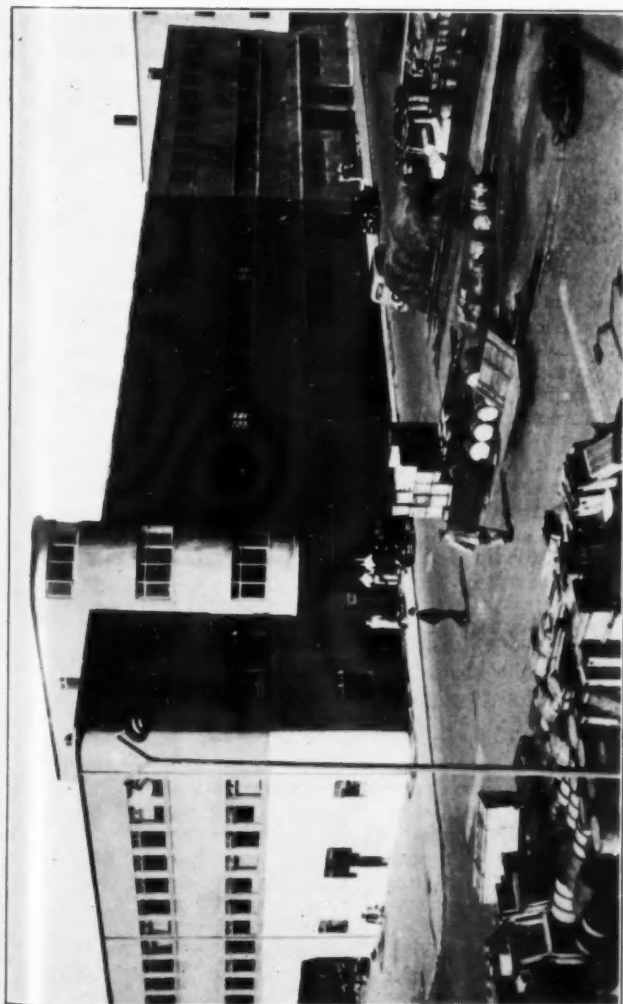
Iceland and its Port—continued



Reinforced Concrete Warehouse at Reykjavik.



Harbour Office at Reykjavik.



Quayside at Reykjavik.



Launching Reinforced Concrete Caisson at Reykjavik Harbour.

Register Tonnage and Load Lines of Merchant Ships

By E. W. BLOCKSIDE, M.I.N.A.,
Author of "Merchant Ships and Shipping," etc.

THE subject under review is one of direct interest to all Dock and Harbour Authorities; it is so involved and difficult of interpretation that the application of the statutory regulations can only be understood in detail by the expert whose daily occupation is to unravel their complications and apply them in practical form to merchant ships.

The shipping industry, which is vital to the existence of the United Kingdom and the British Commonwealth of Nations, is controlled by so many enactments and regulations as to make it difficult to expand, or even maintain its position, in the face of foreign competition. It is suggested the opportunity should be taken, immediately normal conditions at sea are resumed, to consider boldly the advisability of reviewing the situation, with the definite object of reducing the multiplication and complication

There is no scientific basis for the method of measuring British ships for register tonnage. The rules are simply the result of periodical efforts to formulate a method for the assessment of dues. There are many features of the regulations which do not give universal approval and have provoked much discussion in technical societies, among shipowners and dock authorities, but the British method of tonnage measurement has been adopted throughout the world and embodied with slight modification in the "Draft Regulations for Tonnage Measurement of Ships," being the proposals of the League of Nations' Technical Committee on Maritime Tonnage Measurement issued from Geneva in 1931. It is a cause for disappointment that this International Committee has failed to face with confidence the inherent absurdities of the rules relating to *exempted spaces*.

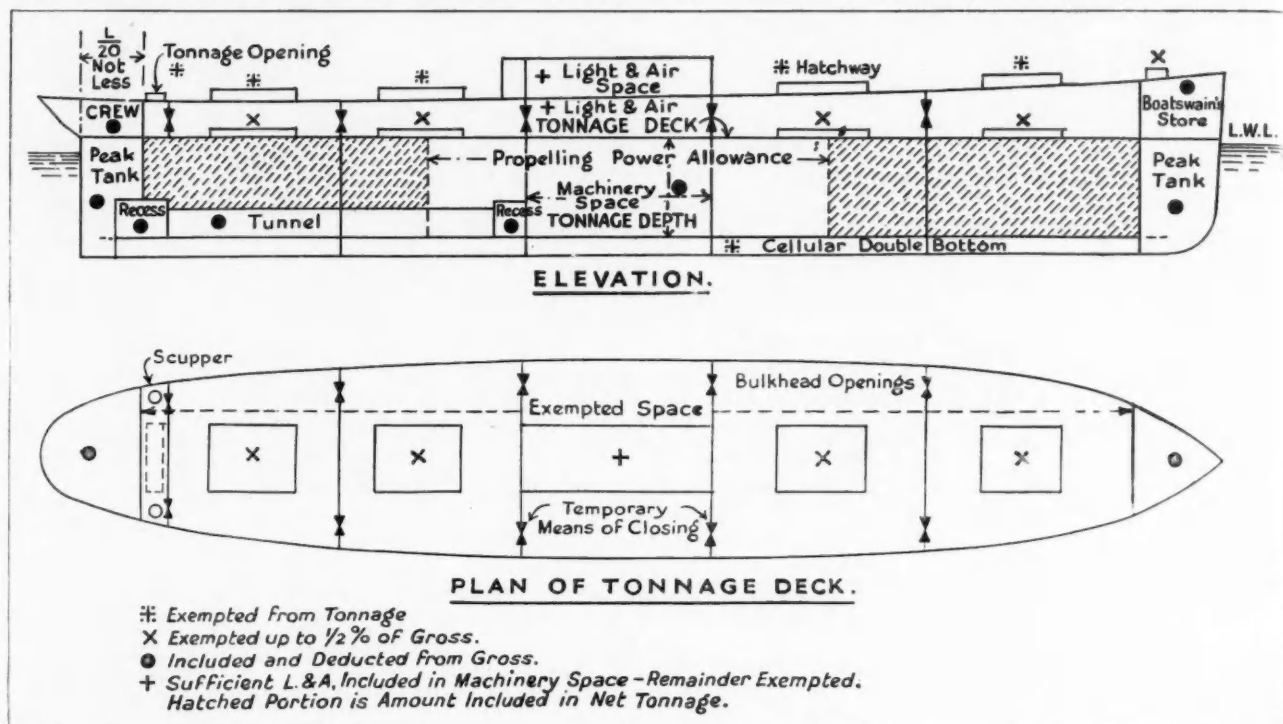


Fig. 1.

of rules and bring them within reasonable narrow limits of application, having regard to their close relationship and inter-dependability.

Tonnage was first introduced in this country in the year 1422 when a Government decree provided that small coasting vessels carrying coals at Newcastle shall be measured and marked. Thus a definite system of *internal capacity* measurement and a method of marking a load line on certain types of ships became operative and compulsory.

Due to the influence of the wine trade with France, when ships carried their cargoes in barrels or tuns whose volume contained 252 imperial gallons, equal in weight to about 2,240 lbs. (avoirdupois), the term *tonnage* was applied to the form of tax levied on those ships, and eventually the size of ships began to be expressed in "tuns."

Some 250 years later it was considered that tonnage should represent the deadweight of cargo which ships were capable of carrying, and the Thames Shipbuilders introduced a formula in 1678 having this object in view. With various changes from time to time it became conclusive that tonnage as then computed did not represent the real carrying capacity of vessels.

In 1854 the first Merchant Shipping Act was passed, which included a new method of measuring ships for tonnage sponsored by Mr. Moorsom, the British Surveyor General for Tonnage. The principle adopted was that the whole internal space of a ship should be measured in order to establish her *capacity*. The total capacity was divided by 100 to give the vessel's *gross tonnage*. The unit of measurement was then, and is now, 100 cubic feet to the register ton. This divisor was apparently used for the purpose of maintaining the least amount of interference with statistical tonnage and the basis for dock revenues.

The regulations now in force are those which were adopted in 1854, but with considerable modification and mutilation in consequence of changes in types of ships.

The Basis upon which Dues and Charges are Paid

Port and Dock Authorities are not bound by national or international law to base their charges on a particular tonnage, or on the method of measuring ships for that tonnage. The tonnage, with particulars of spaces included, deducted and exempted from the gross tonnage and indicated on the ship's register, provide a convenient basis for the assessment of dues.

The revenue of the various authorities who control river, harbour or canal traffic is obtained from tonnage or ship dues, pilotage dues, warehouse and graving dock charges, labourage, the use of cranes, etc. The tonnage dues are assessed on the *net* register tonnage of the ship; graving dock, pontoon and slip charges are almost universally based on the *gross* tonnage; warehouse and labourage rates are based on the actual weight and specie of goods dealt with.

There is lack of uniformity in the world's shipping ports regarding the basis upon which the payment of shipping dues are demanded; some authorities charge ships on entry and again on departure, while others charge on the inward or outward rate, whichever is the greater. In some instances dues are charged on the inward voyage, but when a ship fails to discharge a cargo at the port she pays on the outward trip only. Harbour dues in Holland are, or were, charged on gross tonnage.

Pilotage dues also vary in various localities; in the London district they are levied according to the distance piloted and based on the maximum *draught* of the ship and her *gross* tonnage. In other districts the gross tonnage only is sometimes the basis and in others the draught of the ship and her *net* tonnage.

Lighthouse Authorities are empowered by the terms of the Merchant Shipping Act of 1898 to levy dues on ships for the maintenance of lighthouses, buoys and beacons under their management. These dues are known as *light dues* and are paid on the net register tonnage of the ship, with the addition of any

Register Tonnage and Load Lines of Merchant Ships—continued

spaces occupied with deck cargo. Certain ships are exempted from payment, and there is also a limit placed on all ships in respect of the number of voyages beyond which payment of light dues is not required. The majority of countries charge light dues with the exception of Germany, Italy, Denmark, Belgium and a few others, and they are based on net tonnage, but in some cases on gross tonnage. It will be seen, therefore, there is no universal standard.

Valuable and more detailed information is obtainable from well-known British publications relating to dues and port charges throughout the world, but the foregoing explanation indicates briefly the influence of register tonnage of ships on the methods adopted for obtaining the necessary revenue for the upkeep of harbours and docks.

Rules for the Measurement of Register Tonnages

The principle underlying the regulations for the measurement of ships is that the *net register tonnage* of the ship shall represent the tonnage of her *freight earning spaces*. With this purpose in view all *enclosed* spaces situated above the top of the floors or ceiling if fitted thereon, and within the limits of the inside surfaces of the frames or the inside surfaces of the sparring if fitted to the frames, are measured at various transverse sections of the ship. The position of these sections being determined by the length of the ship, measured on the *tonnage deck* which is the second deck in the case of two, three or more decked ships and the upper deck in a single-deck ship.

The tonnage *below* the tonnage deck is first measured and is usually referred to as the *under-deck tonnage*. Then all enclosed spaces situated *above* the tonnage deck are measured and added to the tonnage below the tonnage deck, the total being the registered gross tonnage.

To obtain the net registered tonnage certain spaces are measured and deducted from the gross tonnage.

Before proceeding it is well to understand the difference between *deducted* and *exempted* spaces. The former must first be measured and included in the gross tonnage before they can be deducted for net tonnage. The latter are not included in the gross tonnage, but they are measured and particulars inserted in the Certificate of Register, which are helpful to the Dock Authorities if cargo is found to be carried in an exempted space. In this respect it is sometimes confusing to the Authorities, when assessing the net tonnage upon which dues are based, to find that cargo is carried in double bottom spaces situated below the top of the floors of the ship, particulars of which do not appear on the ship's register. The Authorities are quite at liberty to add such spaces to the net register tonnage for the assessment of their dues.

Deductions from Gross Tonnage.

The important spaces which are recognised by the regulations for deduction from the gross tonnage of screw steamers are:—

- (a) **Machinery Spaces.** A deduction of 32 per cent. of the gross tonnage is permitted, called the propelling power allowance, if the tonnage of these spaces as measured is not more than 13 and is less than 20 per cent. of the gross tonnage. If the tonnage of the measured spaces is outside this limit the allowance is the tonnage of the spaces as measured with an addition of 75 per cent., subject to certain restrictions.

The additional allowance in excess of the actual measurement is assumed to compensate for the fuel spaces which are not measured.

- (b) Master's and crew spaces.
- (c) Water ballast spaces and cofferdams.
- (d) Boatswain's stores.
- (e) Donkey engine and boiler spaces.
- (f) Chart room.
- (g) Spaces used exclusively for the working of the helm, capstan and anchor gear, if situated below the upper deck.
- (h) Wireless installation.
- (i) Pump rooms (if available for pumping out bilges).
- (j) Lamp rooms.

There are many variations and complications associated with the recognised spaces for deduction, but further reference in detail will only become confusing to the reader.

Exempted Spaces

The difference between deducted and exempted spaces has already been explained. Superstructures situated on or above the upper deck, such as a poop, bridge or forecastle, or a combination of such erections, if they have one or more openings in their sides or ends, and these openings are not fitted with *permanent means of closing*, they are not included in the gross tonnage. Such openings are usually fitted with weather boards in riveted channels or portable steel plates with hook bolts which do not pass through the bulkhead plating.

When the upper deck is covered completely by a superstructure and there is an opening in the superstructure deck of certain limiting size and position without permanent means of closing,

and the openings in the bulkheads between the upper and superstructure decks are also fitted with temporary means of closing; subject also to certain methods of draining the space under the tonnage opening being observed, the 'tween deck space is not included in the gross tonnage. Such a ship is generally referred to as a shelter-deck vessel and is the most popular type of cargo-carrying ship at the present time. (See fig. 1).

Other spaces exempted from Gross tonnage are:—

- (a) Approved spaces erected on the upper deck for the shelter of deck passengers.
- (b) Certain light and air spaces situated over the machinery space.
- (c) The donkey boiler if situated above the upper deck and not connected with the main propelling machinery.
- (d) Hatchways up to one-half per cent. of the gross tonnage.
- (e) Spaces used exclusively for the working of the helm, capstan and anchor gear, if situated above the upper deck.
- (f) Companionways, skylights and domes.
- (g) Galleys, condenser space and bakeries, if situated above the upper deck.
- (h) Water closets and bath rooms for the use of officers and crew, if situated above the upper deck.
- (i) Double bottom spaces, if used exclusively for water ballast.

The subject of deductions and exemptions from gross tonnage has been one of considerable debate among technical experts and in law courts. A full explanation for the reasons which have prompted the Authorities to include them in the regulations cannot be given in this restricted article, but the brief reference will, it is hoped, serve its purpose.

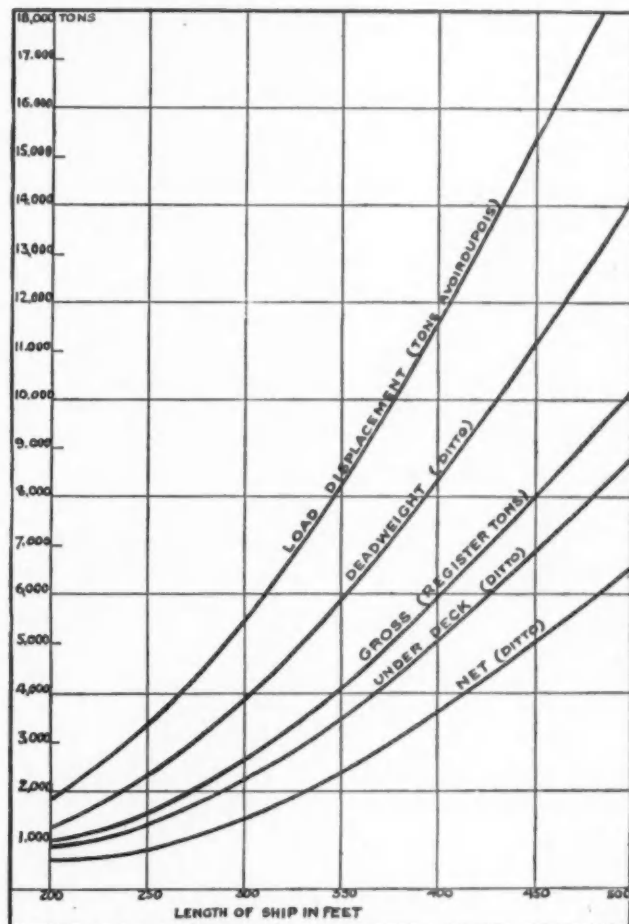


Fig. 2.

When the gross tonnage has been measured and the deductions allowed the result is the *net registered tonnage*.

Fig. 1 shows the spaces which are exempted, deducted and included in the gross tonnage of a ship fitted with a complete superstructure having a tonnage opening in the superstructure deck.

The dimensions of the ship which appear in the Ship's Certificate of Registry are referred to as the *registered dimensions*, being a measured length, breadth and depth; actually they are identification figures which permit a Government official to apply conveniently a check on the identity of the ship. In addition every British merchant ship on completion of the tonnage measurements is allotted an *official number*, which never changes; this also serves the purpose of identification and is cut in on the main beam together with the net register tonnage, usually found

Register Tonnage and Load Lines of Merchant Ships—continued

by lifting the hatch covers at the fore end of No. 2 hatchway on the upper deck.

A diagram is inserted which shows a comparison between the various national registered tonnages, load displacement and deadweight, based on the length of ordinary standard ships with erections covering 50 per cent. of their length (see fig. 2).

Associated with the diagram is a table giving a close approximation of the relation between the various tonnages, load displacement and deadweight, but the particulars cannot be applied to passenger ships and ships of special design.

Length of Ship in feet	Under-deck to Gross	Proportion Net to Gross	Deadweight to Gross	Load Displacement to Gross
200	.79	.58	1.42	2.02
250	.84	.60	1.53	2.27
300	.89	.62	1.55	2.21
350	.90	.63	1.54	2.13
400	.90	.63	1.48	2.03
450	.88	.63	1.40	2.01
500	.87	.63	1.34	2.00

If ships are intended to trade to countries which necessitate their transit through the Suez and Panama Canals it is necessary to have them measured by the Government Authority, for the issue of the special tonnage certificates which are required before vessels are allowed to enter the canals. If ships are not supplied with such certificates they are measured by the respective Authorities at the canal for the assessment of dues, and with consequent delay.

Unfortunately, there is no uniformity between the national rules and those in operation at the Suez and Panama Canals. The sooner a system of International Tonnage measurement is generally adopted the better for all concerned. Although the principle of measurement by the method introduced by Moorsom in 1854 is generally adopted, the deductions and exemptions vary considerably in the canal and national tonnages, more particularly in respect of "open spaces." The brevity of this article will not permit detailed reference to the canal rules.

It is well for shipowners to realise that in the case of British ships carrying deck cargo in an exempted space, the space occupied by the cargo is measured and added to the net registered tonnage for the assessment of dues for that voyage, but when a ship passes through the Suez Canal under similar circumstances the occupied exempted space is added permanently to the net tonnage and cannot be altered until there is a change of ownership.

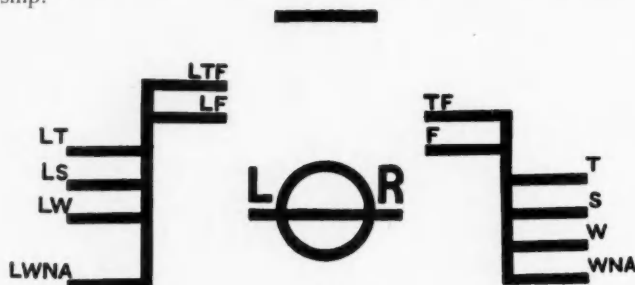


Fig. 3.

Load Lines.

Freeboard is the extent of free side of the ship clear of the surface of water. Board is an old shipping term for side, just as starboard and larboard represented the two sides of a ship. The latter was amended to port to prevent confusion in steering orders.

The maximum water line to which a ship can load with a cargo is controlled by the freeboards marked on her sides amidships, generally referred to as the Plimsoll lines. Passenger ships must also be marked; sometimes an additional mark is added to the grid as shown in Fig. 4, and lettered C, which indicates that when the ship is carrying more than twelve passengers the freeboard is governed by the terms of the Passenger and Safety Certificate. The latter is prepared not as the result of the Load Line rules but in accordance with that portion of the International Convention relating to the Safety of Life at Sea, signed in London on the 5th July, 1930, by the representatives of all the important maritime nations of the world. The passenger load line is the result of calculations approved by the Board of Trade, in the case of British ships, in relation to their sub-division arrangements.

The load lines for vessels carrying cargo are also controlled by the regulations adopted by the International Convention and embodied in the Merchant Shipping (Safety and Load Line Conventions) Act of the 17th March, 1932. Thus for the first time in history a "new order" was introduced, and all nations are controlled by the same regulations which were the result of persistent efforts made by Great Britain and accomplished with complete unanimity without bloodshed.

If the centre of the disc and/or seasonal marks are below the approved sub-division or passenger line the latter is not marked. and the loading of the ship is governed by the cargo load lines. These are extreme cases and usually it is found by calculation that the loading of the ship when carrying more than twelve passengers is controlled by the special passenger load line (C) and not the load lines when the ship is carrying cargo only.

A standard of strength is recognised in the regulations, and if a vessel is assigned a freeboard which permits her to load to the maximum draught allowed by the rules the strength of the ship must be in accordance with this standard. The rules of the Classification Societies comply with the international standard.

A number of passenger and other special types of ships are designed for a particular draught, and in these cases the strength or scantlings of the ship need only be such as to permit of a freeboard being assigned which corresponds to this restricted draught. These ships are classed "with freeboard" by the classification societies. Fig. 5 shows the freeboard marks placed on the ship's sides when the centre of disc controls all the seasonal lines.

Briefly stated the principles which control the load line rules are based on the assumption that the ship is strong enough for the draught permitted by the freeboards assigned. The ship is considered as an intact structure, the uppermost continuous deck being the deck from which the freeboards are marked and referred to as the *freeboard deck*. The standard ship for which the rules prescribe a minimum summer freeboard is assumed to have a forecastle fitted; a proportionate increase is made if the forecastle is not fitted. Tankers must have a forecastle because of the deeper draught permitted.

If a ship is fitted with efficient side-to-side erections on the freeboard deck, called superstructures, they increase the amount of her reserve buoyancy and afford protection to vulnerable openings in the decks, consequently, her summer freeboard is reduced. The value of these superstructures depends on their strength and the type of closing appliances fitted to the openings in the end bulkheads. An allowance is not given for superstructures situated above a superstructure on the freeboard deck.

The standard ship is also assumed to have a certain co-efficient of fineness of underwater form, a standard round of beam and sheer, and a relation of length to depth. If the actual ship differs from the standard in respect of the foregoing, the tabular summer freeboard is reduced or increased accordingly.

The regulations give in great detail the methods which must be observed for closing the cargo hatchways, deck and side openings, sanitary discharges, scuppers, ventilators, air pipes, etc. The height of hatchway coamings, sills to doorway entrances, etc., the facilities provided for clearing deck water quickly by freeing ports, and the protection provided by gangways or lifelines for the protection of the crew must be carefully observed.

Thus when the final freeboards are assigned to a ship it can be assumed that, provided the ship is suitably loaded by the ship's officers in respect of a satisfactory margin of stability, she possesses sufficient reserve buoyancy and is safe for the service she is intended.

There are four sections of the rules dealing with freeboards for

- Steamers carrying ordinary cargoes;
- Sailing ships;
- Steamers carrying timber deck cargoes, which have reduced freeboards due to the increased buoyancy provided by the deck cargo.
- Tankers, which are specially constructed for the carriage of liquid cargoes in bulk. The reduction in freeboards is given for the closer bulkhead sub-division provided by the liquid cargo tanks compared with the ordinary cargo ship.

Load Land Marks on the Ship's Sides.

The summer freeboard is the distance from the top of the freeboard deck at side to the centre of the circular disc. Ships employed in the Great Lakes of North America are marked with a diamond instead of the circular disc.

There are other freeboards marked on the sides in addition to the summer freeboard (S), which are dependent on the seasons and the weather conditions prevailing in various parts or zones of

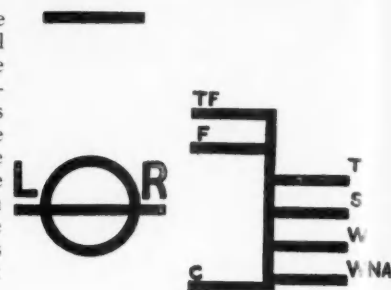


Fig. 4.

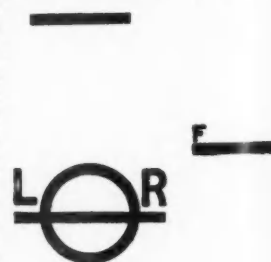


Fig. 5.



Fig. 6.

Register Tonnage and Load Lines of Merchant Ships—continued

the world. Thus we have a winter penalty (W); a further penalty when the ship passes through the Winter North Atlantic zone, which does not apply to ships more than 300-ft. in length (W.N.A.); a reduced allowance when the ship is operating in the tropical zones (T), and further reductions are made for fresh water (F), and (T.F.). (See fig. 3).

When a ship is entitled to carry timber deck cargoes the freeboards marked on the after-side of the centre of the disc, as shown in Fig. 3, control the loading. When carrying ordinary cargoes only then the freeboards marked on the forward side of the disc apply. If the steamer does not comply with the conditions of assignment for the carriage of timber deck cargoes, the special freeboards aft of the disc are omitted. Fig. 4 shows the position of the sub-division line (C) which controls the loading of the ship when carrying more than twelve passengers.

Fig. 6 shows the freeboards marked on the sides of a sailing ship.

It is obvious the Master must watch carefully the loading of his ship in order that she is not overloaded in a particular zone or seasonable period of the year, otherwise the penalty of the law will take effect.

The large letters L.R. marked each side of the disc indicate the initials of the Assigning Body which, in this case, is Lloyd's Register of Shipping. The Board of Trade is the controlling Authority for the assignment of freeboards on British ships, but by the terms of the Merchant Shipping Act power is invested in Lloyd's Register of Shipping, the British Corporation Register of Shipping and Aircraft, and the British Committee of the Bureau Veritas to assign freeboards on their behalf. Lloyd's Register of Shipping is also authorised to assign freeboards on behalf of all foreign Governments with the exception of Germany, Italy, Japan and the U.S.S.R., who carry out the work by their own staffs.

Certificates and Surveys

Every ship having freeboards marked on her sides must have a Load Line Certificate, which is issued for a period not exceeding five years. It is placed on board and usually found framed in the Chart Room. On the anniversary of the issue of the certificate an annual load line survey is carried out by the Assigning Body and the certificate endorsed. Before the date of validity expires a full renewal survey with the vessel in dry dock is undertaken, usually in conjunction with the special survey of the Classification Society. Thus ships are maintained in an efficient condition.

The foregoing explanation of the salient features of the Tonnage and Load Line Rules will, it is hoped, be of some service to officials of Dock and Harbour Authorities. It will also be realised how important it is for ship owners to understand the influence of these regulations on ships in order that they may embody the advantages of both in their designs, for the two subjects are inseparable.

Legal Notes

The Use of Slings for Cargo Handling

Accident Claim

In an action at Liverpool Assizes on February 7th, before Mr. Justice Hallett, George Stanley Neville, a dock labourer, of Short Street, Wallasey, sought to obtain damages for personal injuries from W. H. Rhodes and Co., stevedores, of Oriol Chambers, Water Street, Liverpool.

The claim arose out of an accident which took place in August, 1939, while a steamer was being loaded with general cargo in a Liverpool dock. Part of the cargo consisted of asbestos cement pipes, each weighing about one cwt., which were being lifted on to the steamer from a barge alongside. According to plaintiff, a sling containing pipes was being lowered down the vessel's hatch when it fouled the coaming, with the result that the pipes were thrown out of the sling. Plaintiff was seriously injured.

For the plaintiff it was alleged that the accident was due to the use of a rope-legged, or hook, sling, instead of a single-eyed, or "snottier," sling; and also that the sling was overloaded. Defendants denied these allegations and said that the accident was due to the action of a workman in lowering the sling too early.

Defendants' Counsel called a number of witnesses to show that the use of the rope, or hook, sling had been followed for many years, and had not proved unsatisfactory.

Mr. Justice Hallett said he was not satisfied that the "snottier" sling was superior to the other kind of sling. The accident, in his opinion, was not caused by any lack of reasonable care as regards the method of handling the load of pipes in so far as the sling was concerned. The defendants were not responsible and he gave judgment for them, with costs.

Taxation Value of a Grain Silo

Judgment has been given by the Recorder of Belfast on an interesting question of law concerning the valuation of a grain silo at Belfast Harbour owned by W. and W. Barnett, Ltd., grain merchants, Belfast.

The first appealed against a valuation of £1,925 on the ground that it was too high and that the silo should be classed as a freight-transport hereditament by reason of the fact that the business was wholly under Government control and that the firm was no longer actually engaged in dealing in grain.

Counsel for the Commissioner of Valuation contended that the bulk of the grain reaching the silo had reached its home port and was not in transport, and that therefore the premises were not a freight-transport hereditament.

Dismissing the appeal, the Recorder held that the silo did not comprise, as part thereof, a dock. He agreed to state a case.

Notable Port Personalities

VIII.—Mr. R. P. Biddle, M.Inst.T.

Mr. Reginald Poulton Biddle, Docks and Marine Manager at Southampton, joined the London and South Western Railway Company in Jersey, September, 1905. In 1907 he was transferred to the Marine Department at Southampton, there gaining experience in the various branches of cross-channel freight working. For some years he was personal assistant to the Chief of the Marine Freight Department, until in 1914, he was attached



to the then Docks and Marine Manager. Obtaining a commission in the Hampshire Regiment in 1915, he served in India, and afterwards with the Egyptian Expeditionary Force. After the war he was appointed, first, chief clerk, and then, in 1926, assistant to the Docks and Marine Manager. In 1927 Mr. Biddle was given the position of Assistant Marine Manager, and in 1933, that of Assistant Docks and Marine Manager, which post he held until October, 1936, when he was promoted to his present position of Docks and Marine Manager. Mr. Biddle is a Chevalier of the Legion d'Honneur.

Utilisation of British Canals

Ministerial Investigation

In the House of Commons on February 6th, Col. Moore-Brabazon, Minister of Transport, replying to Mr. Loftus (Cons.), said that he had under consideration an investigation into the carriage of goods on the canals and inland waterways, but he was not yet in a position to make any statement on the subject.

Mr. Loftus, who recalled that the whole canal system was taken over in the last war by the Government, suggested that if it was efficient it would relieve a great deal of our present difficulties.

Col. Moore-Brabazon replied: I am aware of the implication of the first part of the question, and I am extremely conscious of the fact that the canal system wants tuning up and I am gradually becoming very barge-minded. (Loud laughter). Investigation has been going on during the last few weeks.

Notes of the Month

Mersey Dock Board.

The Minister of Transport has appointed Mr. R. J. Hall as a nominee member of the Mersey Dock and Harbour Board to fill the vacancy caused by the resignation of Mr. Jas. L. Ferguson. Mr. Hall was Lord Mayor of Liverpool in 1935-36.

New Port on the Rhine.

It is announced that a new port on the Rhine at Birsfelden, near Basle, the construction of which was commenced in December, 1937, has been completed. It is designed for the relief of congestion at the adjacent river ports of St. Johann and Kleinhuningen.

New Port on the White Sea.

The Russian Soviet Government is reported to have built a new port South of Kem, at the point where the River Wyg flows into the White Sea. It is stated from a Swedish source that six quayside berths have been provided for passenger vessels, tankers, trawlers and timber carriers.

Sunderland Port Charges.

The Minister of Transport has under consideration an application from the River Wear Commission for consent to an increase in their charges to 100 per cent. above pre-war rates. Permission was given a few months ago for an increase to 40 per cent.

Dredging the Hai-Ho Bar Channel.

The September Report of the Hai-Ho Conservancy Commission, Tientsin, announces that a dredger has been at work on the bar channel. Since then, the signalled depth of the channel has been 6-ft. 6-in. below the Taku datum. The highest high water was 17-ft. 9-in. and the lowest high water was 14-ft. 3-in., both during the month of September.

Prosperity at South African Ports.

The latest report of the South African Shipping Board shows that South Africa has derived considerable benefit from the diversion of the Mediterranean shipping traffic to the Cape route to the East. Many South African ports are stated to be enjoying a boom such as has not been experienced since the days before the opening of the Suez Canal. Shipments of South African delicacies to the United States have also greatly increased.

New Swedish Floating Dock.

A new floating dock of 14,000 to 15,000 tons lifting capacity has been decided upon by the Finnboda Shipyard in co-operation with the civic administration of Stockholm and is already in course of construction. It will be the largest in size and capacity on the East Coast of Sweden. At the same yard a new fitting-out quay of reinforced concrete is to be built and equipped with a 5-ton travelling crane.

Death of Liverpool Dock Board Member.

The death has been announced of Mr. Maurice H. Hulme, a member of the Mersey Docks and Harbour Board since 1934. Mr. Hulme was general manager of Coast Lines, Ltd., and had been associated with coastwise shipping throughout his business life. He had served upon the Pilotage, Docks and Quays, Traffic, Marine and Works Committees of the Board, and at a recent meeting, Sir Richard Holt, the chairman, paid an appreciative tribute to his services.

Boat Harbour at Auckland, N.Z.

An enclosed area for small craft is in course of construction at Okahu Bay, Auckland, New Zealand. It is being surrounded by a line of turpentine piles extending for 4,800-ft. towards the City from the Orakei Wharf. This screen will suffice to break the force of heavy seas. Access to the enclosed area of 280 acres will be available at each end of the screen, while a gap, 150-ft. in width, will afford space for a yacht to run in under a North-easterly gale. There will be accommodation for 700 yachts and motor boats.

Gallantry of Dock Crane Driver, and Labourer.

A particular instance of great gallantry on the part of a crane driver and a dock labourer has been reported from Southampton, where Mr. Frederick Charles Clouder has been awarded the British Empire Medal for his courageous share in the rescue of a soldier from the roof of a high building at the quayside. The soldier, who had been manning an anti-aircraft gun was lying unconscious on the roof, along which flames were spreading rapidly. Clouder voluntarily climbed into his crane cabin, already threatened by the fire, and hoisted the labourer, named W. W. Fisher (who was subsequently given the George Medal), to the top of the building where a rescue was effected in the nick of time.

Timber Imports During 1940.

According to Board of Trade Returns the value of all timber imported into this country during 1940 was £37,098,681, compared with £37,128,694 for the previous year and £42,852,348 for the year 1938.

Protection of the Welland Canal.

Special steps are reported to have been taken by the Canadian Government for safeguarding the Welland Canal from attack by hostile aircraft. The nature of these precautionary measures is, of course, not disclosed.

Forth Conservancy Board.

At the last Quarterly Meeting of the Forth Conservancy Board Capt. Cedric A. Salvesen, M.C., was appointed to the office of chairman for the next three years, in succession to the Right Hon. the Earl of Elgin.

Manchester Ship Canal Company.

The net revenue for the year 1940 of the Manchester Ship Canal Company, after deducting interest and fixed charges and provision for taxation and reserves, was £215,219, as compared with £215,007 the previous year.

Death of River Commissioner.

By the death, as the result of an accident, of Sir Luke Thompson, formerly M.P. for the borough, Sunderland has lost a member of the River Wear Commission who had served the interests of the port in various ways, since his appointment in 1932 as representative of the Ministry of Transport.

New Reinforced Concrete Floating Plant.

The All-Union Trust of Reinforced Concrete Shipbuilding in Leningrad is reported to have in hand a floating dock of 15,000 tons lifting capacity. The Trust is also designing 20 reinforced-concrete lighters of 2,000 tons to a standard type. This will be the first fleet of this class in the Soviet Union.

Regional Port Director Appointed.

The Minister of Transport has appointed Mr. R. Hugh Roberts to be Regional Port Director for the Bristol Channel, comprising all ports between Fishguard and Bristol. His duties are the same as those prescribed for the Merseyside and Clydeside areas, particulars of which were given in the last issue of this Journal.

Tyne Emergency Ferry.

To meet the contingency of an interruption, due to enemy action, in the normal means of public transport in the Tyne District, an emergency ferry service has been arranged so that workmen will be able to reach their employment centres in the shipyards. The service will be put into operation immediately the necessity arises.

Cardiff Pilotage Authority.

At the recent annual meeting of the Cardiff Pilotage Authority, it was reported that the earnings of pilots during 1940 amounted to £46,174 as compared with £48,000 in 1939. The number of vessels handled was larger, but their total tonnage was less, this fact accounting for the decrease in earnings. It was agreed that pilots should receive a 25 per cent. war bonus.

Dock Fatalities in Black-Out.

A considerable number of drowning fatalities during periods of black-out have occurred recently at ports on the North-east Coast, and coroners have urged seamen returning to their ships to take greater care. In some cases men were stated to have been intoxicated, but most accidents have been due to men walking unwittingly over the dockside. Rescue work in the dark has had but limited success.

U.S.A. Port Committee on National Defence.

The Port Committee on National Defence recently formed in the United States comprises the following members: Col. B. C. Allin (Chairman), Port Director, Stockton, California; Mr. Billings Wilson, Assistant General Manager, Port of New York Authority; General Richard K. Hale, Associate Commissioner and Engineer, Massachusetts Department of Public Works; Mr. J. Alex. Crothers, General Manager, South Jersey Port Commission; Mr. Edwin R. Cox, Director, City of Philadelphia Harbour Department; Col. Marcel Garsaud, General Manager, New Orleans Board of Harbour Commissioners; Col. Chas. I. Leeds, Consulting Engineer, Los Angeles; Mr. Frank G. White, Chief Engineer, Board of State Harbour Commissioners, San Francisco; Col. W. C. Bickford, General Manager, Port of Seattle; Mr. Martin Oettershagen, Harbour Engineer, Chicago and Mr. C. U. Smith, General Manager and Chief Engineer, Board of Harbour Commissioners, Milwaukee.

The Port of Liverpool

An Historical Survey

By J. N. BENSON.

(Concluded from page 82)

Trade Development

The building of docks was not the only work undertaken by the Liverpool Council. Roads were built to Prescot and Warrington bringing the town into touch with the great north and south coach routes. Inland waterways were also being made navigable, and Liverpool found much of the money for these enterprises. These gave Liverpool the advantages which other ports had had to her detriment. Liverpool has never been a manufacturing centre to any large extent; she is essentially a "porta," a gate, and she now has passages on both sides of that gate, roads on the seas for her ships, and roads to serve the country.

The growth of trade can be mirrored in the growth of the population of the town—5,000 in 1700, 18,000 in 1750 and 25,000 in 1760, and the increase in the number of vessels owned by the port—about 70 in 1700 and 220 in 1751.

Trade with the new world was chiefly responsible for the rise of Liverpool's prosperity. There was a small trade with the American Colonies, and the British West Indies supplied sugar, tobacco, and cotton, the main commodities of Liverpool's trade. The Spanish government, in order to keep the trade with its colonies in Central and South America for the home market, made very stringent rules with regard to foreign trade. The result of this was smuggling on a large scale. The Spanish smugglers haunted Jamaica to buy the goods which their rulers forbade them to buy at home and the English tried to evade the Spanish coast-guards and trade direct with Mexico and Cuba. In 1757 there were 106 Liverpool vessels employed in this trade making an annual profit of about a quarter-of-a-million pounds.

The Slave Trade

This trade was finally stopped by order of the British Government after it had caused several wars with Spain, but in the meanwhile another still more lucrative and still more questionable trade had arisen. The foundations of many Liverpool family fortunes were laid by the profits from this trade. I refer to the Slave Trade.

Liverpool did not come into this trade until some years after London and Bristol, but she soon captured the greatest share of it. The reason for its lucrativeness was the triangle of trade; cheap Manchester goods, bad muskets, glass beads, and inferior spirits to Africa, slaves from there to the sugar plantations, and sugar, and rum, and tobacco for home. In 1792, when the trade was at its height, it was estimated that Liverpool enjoyed five-fifths of the English trade in slaves, and three-sevenths of the whole slave trade of all the European nations.

At this time the trade was looked upon as being quite honourable; the "African trade" it was called. Anyone who spoke against it was looked upon as a misguided sentimentalist. But the reaction came, and, in 1787, the "Society for the Abolition of the African Slave Trade" was formed in London. Public opinion was slowly worked up against it, but in Liverpool it was said that if ever the faddists had their way, grass would soon be growing again in Castle Street.

William Roscoe, one of Liverpool's greatest citizens, had made a name all over the world as a writer of poetry against the slave trade, and, in 1806, the people of Liverpool, although they did not like his politics, returned him to Parliament as their representative, and by a freak of fortune, in the few months for which he sat, he was able to speak and vote for the Act which abolished this trade.

The slave trade ended on May 1st, 1807. The last ship to sail from Liverpool on the triangular course was the *Mary*, Captain Hugh Crow, a man who treated his slaves well and was always welcomed by them when he visited the plantations. His cargo of four hundred slaves was the last shipment sold by English merchants to the New World.

Increase in Dock Accommodation

With this increase of trade the demand for more dock accommodation naturally arose and, in 1762, the Corporation applied to Parliament for permission to build another dock. The preamble to the Bill mentioned that at times even His Majesty's ships of war were compelled to anchor in the river on account of the congestion in the docks. Parliament granted this, and sanctioned the borrowing of a further £25,000, the work being started a few years later under the direction of Henry Berry, the second Liverpool dock engineer. This dock was opened in 1771, and was called the

George's Dock. In 1788 the King's Dock was opened and this was followed eight years later by the Queen's Dock, the first mentioned costing £25,000 and the latter £35,000. The King's Dock was the last work carried out by Henry Berry, although it is believed that he drew up the plans for the Queen's Dock, the work being carried out by Thomas Morris, the third engineer of the docks.

Creation of Dock Trustees

Up to the year 1761, the control of the small estate was in the hands of the Corporation, but in that year there was made a small alteration. The property, docks, piers, buoys, landmarks, etc., were vested in the Mayor, Aldermen, Bailiffs, and Common Councilmen of Liverpool, who were given power to bring or defend actions under the name of the "Trustees of the Docks and Harbour of Liverpool." Another change was made in 1811—the management was delegated to a committee of 21 members of the Common Council who were known as the "Trustees of the Liverpool Docks," but their proceedings were still subject to the veto of the full Common Council.

More dock accommodation was required and in 1816 the Queen's Dock was enlarged and the Union Dock built, followed in 1821 by the Prince's Dock. This latter was opened on the 19th July, the day of the Coronation of King George IV. and was commemorated by a splendid procession. The estimated cost of the dock and marine works attached to it was £650,000.

The need for this increase of dock accommodation can be seen when it is noted that, in 1751, the total of inward and outward tonnage amounted to 65,406 tons, in 1791 to 539,676 tons, and in 1835 it had reached 1,768,426 tons.

The Atlantic Trade

The period 1756 to 1851 was an age of war, but Liverpool benefited by it because foreign rivalry was, to a large extent, destroyed, and this enabled the Liverpool merchants to obtain a better hold on the Atlantic trade. These markets required manufactured goods from England. This period was also the age of the Industrial Revolution, which increased the producing power of the home manufacturers thereby supplying the demand. The invention of spinning and weaving machinery, and the application of steam to machinery, reduced the cost of cottons and woollens, Lancashire and Yorkshire trades respectively—the discovery of a method of smelting iron by means of coal instead of wood made the Western Midlands busy and populous, and the improvements in the manufacture of pottery and glass made Staffordshire and South Lancashire wealthy.

The growth of the United States of America came in time to compensate Liverpool for the loss of the slave trade, and the trade with that country soon replaced Africa and the West Indies as the principal markets for English commodities and the principal sources of supply for raw materials.

Up to the year 1813 the East India Company operating from London had held a monopoly of trade with India, but in that year it was thrown open to all merchants and in 1833 the China trade was also thrown open. Liverpool merchants quickly took advantage of this and found good markets for Lancashire cotton goods and also fresh supplies of raw cotton. The Central and South American markets were also opened at this time.

The Canal Period

As mentioned earlier, a port needs roads in and out, and this period was largely responsible for the building of canals. The principal ones affecting the prosperity of Liverpool were the Trent and Mersey Canal, begun in 1765; the Mersey and Calder Canal which gave direct communication between Hull and Liverpool; the Leeds and Liverpool Canal, begun in 1767; the Mersey and Severn Canal, and the Grand Junction Canal, giving through communication with London. In 1830, the Liverpool and Manchester Railway was opened when, unfortunately, Huskisson was killed. Steam had been applied to machinery and in 1815 the first steamboats appeared on the Mersey. Before very long the steamship was to save the merchants thousands of pounds through overcoming the delays caused to sailing vessels by lack of wind or adverse winds.

The Common Council, by virtue of its power of veto over the affairs of the Dock Committee, still held control of the dock estate and this was very unsatisfactory to the merchants using the docks who asserted that the work required special and expert knowledge. In 1825, therefore, a compromise was made, and "The Committee for the affairs of the Estate of the Trustees of the Liverpool Docks"

*Lecture delivered to the Bromborough Society on November 9th, 1940.

A History of the Port of Liverpool—continued

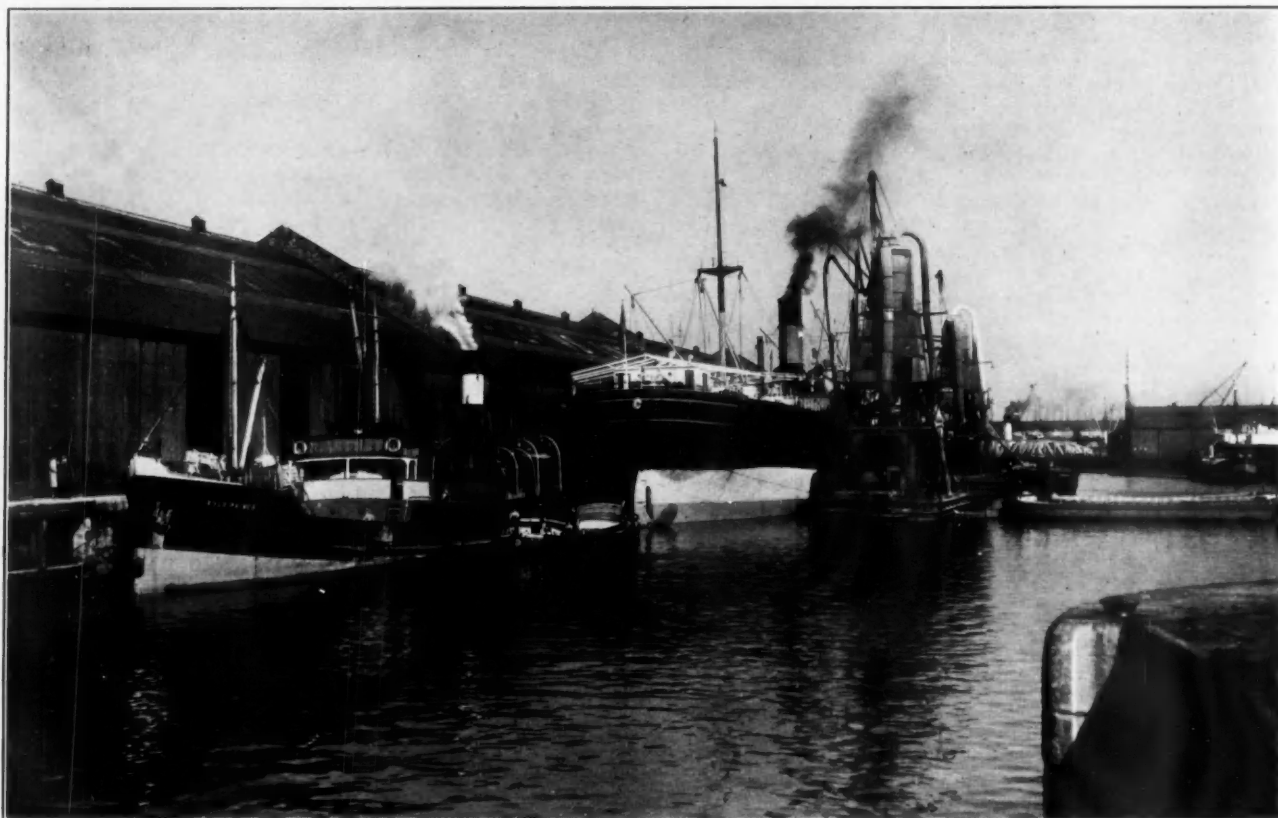
was set up by Act of Parliament. This Committee consisted of twenty-one members, thirteen nominated by the council and eight elected by the dock ratepayers, the council still keeping a working majority. This resulted in unceasing friction, the merchant members forming a solid minority in opposition but it was not until 1851 that any change was made. In that year the number of members of the committee was increased to twenty-four, twelve nominated by the council and twelve elected by the dock ratepayers.

On the 31st August, 1826, the Old Dock was closed to shipping and filled up, the Custom House being built on the site. New docks were opened now, in quick succession, 1829, the Canning Dock; 1830, Clarence Dock; 1832, Brunswick Dock; 1834, Waterloo Dock; 1836, Victoria Dock and Trafalgar Dock; 1840, Coburg Dock; 1842, the Canning Dock was enlarged and the Toxteth Dock

This included the Bramley-Moore Dock and the Salisbury, Collingwood, Stanley and Nelson Docks. The actual water area of the docks now stood at 152 acres, and during the succeeding nine years five more docks were added. Not only were new docks being built but the old ones were also being brought up to date in their equipment, the entrance improved, and the docks themselves enlarged.

The Birkenhead Docks

Meanwhile the Cheshire side of the river had not been idle. On November 7th, 1843, the Birkenhead Commissioners decided to build a dock in the Wallasey Pool and applied to Parliament for permission to borrow the necessary money. The following year, the Bill received the Royal Assent and a Dock Company was formed to carry out the work. This was started immediately for



Dock Scene at Liverpool—Loading and Discharging Simultaneously.

was opened, and in 1845 the Albert Dock was opened, the first vessel to enter being the *Ariel* belonging to Messrs. T. and J. Brocklebank.

This dock was named after H.R.H. Prince Albert and the following year he paid a visit of inspection to Liverpool. He cruised up and down the river in the Royal tender, the *Fairy*, and then entered the Albert Dock. Here he was given a terrific welcome by the thousands who lined the quays and a salute was fired in his honour. A banquet was held in one of the rooms of the Albert Dock Warehouses at which the chairman of the Dock Committee presided. Queen Victoria held a Jubilee banquet in these warehouses in 1888 and the room used is known to this day as "Jubilee Hall." The dock and warehouses cost nearly half-a-million pounds to construct.

Up to this time British ships and British commodities had had very little competition with which to contend, but, with the period of comparative peace, other countries entered the field. The people of the United States of America began to discover the enormous resources of their own country and every government encouraged the home production of goods which had hitherto been purchased from England. From this it would be expected that the trade of Liverpool would have declined, but it did not, it continued to increase. The amount paid in Customs at Liverpool in 1784, was £649,000, in 1848 the amount was £3,482,000; £23,380 was paid in 1800 for Dock Dues, for the half-year ended February 28th, 1848, the amount was £40,000. In 1853, the tonnage of shipping using the Port of Liverpool was almost a million tons, double what it had been eight years previously. These figures, the tonnage of ships using the port, the amounts paid in Customs, the amounts paid in Dock Dues, continued to increase year by year, sometimes only by a small increase, but the movement was always progressive.

This naturally led to the demand for more docks, and on the 4th August, 1848, a system of docks carried northward was opened by John Bramley-Moore, Esq., Chairman of the Dock Committee.

four months later the foundation stone of the New Docks, Birkenhead, was laid by Sir Philip de Malpas Grey Egerton, Member of Parliament for South Cheshire. A Bill was passed by the House of Commons in March, 1845, for a second dock; 1847 saw the opening of the first dock by Lord Morpeth, who, at the same time, opened the warehouses adjacent to the dock and the Birkenhead Park. Four years later water was let into the Great Float, and the *Bess Grant*, with a cargo of mahogany was the first vessel to enter.

Formation of the Dock Board

These two docks were sold in 1855 to the Liverpool Corporation, who then had control of the docks on the Lancashire side of the river, and thus brought the control of the Birkenhead and Liverpool Docks under one authority.

Their management of the dock estate was evidently not proving satisfactory for in 1853 a Royal Commission was appointed to consider the growing needs of the port. This commission recommended that a governing body be constituted to whom the property and the power to collect dues be transferred. The result of this was the passing, in August, 1857, of the "Mersey Docks and Harbour Act."

This was:—"An Act for consolidating the Docks at Liverpool and Birkenhead into One Estate, and for vesting the control and Management of them in One Public Trust, and for other Purposes."

This Act called for a further Act in the following year to consolidate all the previous Acts of Parliament which had been passed for the building and ordering of the dock estates on both sides of the river, now known as the Mersey Dock Estate. The title of this Act was "The Mersey Dock Acts Consolidation Act, 1858," and set up the Board as it is still constituted. It consists of twenty-eight members, twenty-four elected by the dock ratepayers and four nominated by the Mersey Conservancy Commissioners, now the Ministry of Transport.

A History of the Port of Liverpool—continued

In the 1857 Act an elective member of the Board had to pay a minimum of £50 in dock rates, but this figure was reduced by the later Act to £25, and all electors had to pay a minimum of £10 to qualify for their vote. Thus the control of the great undertaking was taken out of the hands of the Corporation and put into those of the business people of the Port. The members of the Board make no profit from their work, and any member who makes a profit solely through his Membership is subject to immediate disqualification. The Members receive no remuneration for their services, the position is purely an honorary one.

The Liverpool Estate was made over to the Board on condition that they took over £6,000,000 of the Corporation debt, that being the estimated amount expended on the works, and the Birkenhead Estate was made over charged with the existing debt of £1,400,000.

into the others thus keeping the whole dock system up-to-date and available for the ever-increasing volume of trade.

A horse-drawn railway (it took five horses to pull six wagons) joined the station serving the South docks with that serving the North docks and in 1895 an innovation, which was to have far-reaching results, took place. Locomotives were introduced which could draw forty wagons. They ran on shale oil to prevent any danger if fire caused by sparks coming from their tunnels. In the same year the Riverside Station, at the rear of the Princes Landing Stage, was opened. A network of railways now covers the Dock Estate and every important berth is served. Goods can be transferred direct from ship to railway wagon thus saving time and labour costs for the importers. The same applies to exporters.

In the year 1900, the value of goods passing through the port,



A busy roadway scene at Huskisson Dock, Liverpool.

With occasional lean years, trade continued to expand. In 1800, the number of vessels using the docks was 4,746, paying dues on 450,060 tons; in 1881, 20,249 vessels paid dues on 7,893,948 tons. This increase had naturally called for new docks and these were provided. The prestige of the port had risen to such an extent that, in 1881, when a new system of docks was complete T.R.H. the Prince and Princess of Wales agreed to perform the opening ceremony, which took place on September 8th.

Their Royal Highnesses were conducted to the landing stage at the Pier Head where they boarded the *Cloughton*, a paddle steamer belonging to the Birkenhead Corporation and loaned for the occasion. H.M.S. *Defence* was anchored in the river opposite the stage and as the *Cloughton* steamed away she fired a salute of twenty-one guns. On arrival at the Langton Dock entrance the Royal Party landed and Mr. Hornby, the Chairman of the Board presented the Prince with a magnificent gold hunting knife, studded with diamonds, pearls and turquoises. This fitted inside a lever, which, when H.R.H. pulled it, opened the entrance gates. The opening was greeted with royal salutes from H.M.S. *Agin-court* and the battery at the Langton Dock entrance, and a shower of rockets was sent up in the air. The Royal Party rejoined the *Cloughton* and sailed round the Langton Dock and into the adjoining dock. Princess Alexandra was here presented with a parasol, the handle of which was a richly jewelled pen knife. With this she severed a piece of silken cord, thus breaking a bottle of champagne over the bows of the *Cloughton*, and said "I name this the Alexandra Dock." Luncheon was taken in one of the dock sheds and nearly fifteen hundred people sat down at tables covered by two miles of table linen.

The Hornby Dock, part of the Alexandra Dock system, was opened in 1884 but during the ensuing twenty-five years no new extensions took place, but, with the increase in the tonnage of the vessels using the port, some of the existing docks had become almost useless, they were too small. Some of these were merged

both imports and exports, was £207,000,000; 2,085 vessels were registered in Liverpool, their total tonnage being over two million tons. In 1881, dock dues were paid on nearly eight million tons; in 1905, the figure was sixteen million tons. From 1800 to 1881, the tonnage increased seventeen-fold; from 1881 to 1905 it had doubled.

Recent Events

Parliamentary powers for the carrying out of a large extension of the dock system, on land and foreshore previously acquired by the Board at the extreme north end of the Dock Estate were obtained in 1906. This new dock was to be the Gladstone Dock. Owing to developments in shipbuilding the Board decided to put in hand a combined wet and graving dock in advance of the main body of the intended general scheme. Thus the Gladstone Graving Dock, costing £500,000, came into existence and was opened by King George V. on the 11th July, 1913. The construction of the wet docks was interrupted by the outbreak of war when, in common with other similar works, operations were reduced to a minimum. Work was re-started after the Armistice, further sums were expended in the provision of special plant, the entire Gladstone Dock System being formally opened by King George V. on the 19th July, 1927.

After luncheon at the Town Hall, Their Majesties boarded the *Galatea* at the Prince's Landing Stage and sailed down the river. They entered the Gladstone Lock, breaking a ribbon stretched across the entrance in doing so, and disembarked at the east end of Branch Dock No. 1. Here addresses were read and the King declared the docks open. In the course of his speech, His Majesty said "The increase of Commerce is of far more than local interest. The expansion of your trade implies an advancement of world commerce and a strengthening of those links of mutual advantage which unite the peoples of the British Empire and further its good relations with friendly countries in every quarter of the Globe. I shall always be happy to be associated with any enterprise directed to this benevolent end."

A History of the Port of Liverpool—continued

In 1929, the Clarence Dock was closed for the building of Liverpool Corporation Power Station and the adjacent docks, the Trafalgar, Victoria and Clarence Half-tide Docks, were rebuilt and made into one dock, the Trafalgar Dock.

During recent years there has been a considerable development in the coasting trade and the tonnage of shipping engaged in it has increased, necessitating the provision of more suitable accommodation. In order to retain its supremacy in this, as in other branches of shipping, the Board is at present engaged in two schemes which should assist materially in the expansion of Liverpool's coastwise trade.

At the Prince's Dock a graving dock, which has been out of commission for some years, has been converted into a wet dock with berth and shed accommodation on the west side. Coastwise shipping has been using the central docks.

As mentioned earlier, Chester was once a serious rival of the Port of Liverpool, but owing, among other reasons, to the silting up of the Dee she had to abandon all thought of being a major port. In the year 1900, it was first noticed that the Mersey threatened to silt up and a system of revetments was devised. A wall was built on the Liverpool side of the river a few years later but then the Great War intervened and little dredging was done. The position again became serious after the peace was signed and it was decided to build another wall on the Cheshire side of the river, and thousands of tons of rock were brought from North Wales for that purpose. That wall has reached the Formby Light and it has been decided to continue it half-way to the bar. This extension will reduce the curve of the channel and, more important, it is expected to reduce the amount of dredging necessary. At present the ebb and flow tides do not work together but, flowing into different pools, cause large sand deposits. When the parallel walls have reached their full length, more than seven miles in the case of the wall on the Cheshire side, it is

anticipated that the tides will work together and dredge the river automatically. The Board have a fleet of fourteen dredgers and nineteen hoppers—if a large portion of the dredging can be worked by the tides the whole of this fleet will not be necessary, thus the working costs of the port will be greatly reduced.

Dockers and a Bonus Scheme

"Possible methods of achieving a quicker 'turn round' of ships and the speedier handling of commodities at the docks will the *Daily Post* understands, be considered by a sub-committee which is to be set up by the Employers' Association of the Port of Liverpool.

"The quick handling of tonnage and the speedy discharging and loading of cargo ships is vital to the war effort and it is hoped to get as much work as possible done in daylight without calling on dockers for too much overtime.

"The sub-committee may recommend a bonus scheme as one way of getting increased output. Under this, dockers would be paid a standard rate for half-a-day's work and would then get an agreed bonus for every ton of cargo handled over a certain amount. This scheme already operates in connection with a few commodities, sugar being one of them, in Liverpool. There are many who advocate the dockers being turned over to piece rates which has been proved, at the London Docks, as a system that 'delivers the goods.'

This was reported in the *Daily Post* and in the same edition was a report of an address, made by Major the Hon. Leonard Cripps, which also advocated some system of piece or bonus working, and put forward other suggestions for improving the working of the port. These are but two instances of the work continually going on to make a future for the Port of Liverpool worthy of the almost unknown pioneers of three hundred years ago who little knew the mark they would make, not only on the banks of the Mersey, but on the commerce of the whole world.

Port Organisation for War

Reproduced below is a statement of views which has been received from a body called the "Vigilance-for-Victory Group." It is stated to be composed "primarily of politicians who can implement the work of the House of Commons, prominent newspaper men and publicists who can report accurately upon public opinion and give it expression, and experts of trade and the professions which are affected by the problems which the group takes up and examines."

Properly run dock and port systems are vital to the success of any system of communications. The great problem in the present war—as in France during the last war—is to avoid the congestion which arises from the arrival, at ports not adequately equipped for their reception, of abnormal quantities of food and materials for military, industrial and civil needs.

Movement of shipping is dictated by strategic conditions outside the control of the port organisations, but equipment and accommodation should be available in each port area for dealing, with the greatest despatch, with any tonnage which presents itself.

German Occupation of Channel and Atlantic Ports.

Careful consideration has already been given by the Ministry of Transport to the question of ports working under war conditions, and co-ordinating organisation has been devised for such working. The difficulties arising from the German occupation of the Channel and Atlantic Ports have not, however, been adequately measured. What was an emergency organisation for coping with shipping diversion resulting from occasional air and naval interference is not capable of dealing with the situation arising from a more permanent loss of more than 25 per cent. of our most efficient port accommodation. While heavy additional burdens are thrown upon them, because of the fact that access to Southern, South-eastern and Eastern Dock systems is restricted, the Western Ports as a whole are not equipped for intensified working on a war-time scale.

Little has been done, so far, to increase their efficiency, beyond the establishment in one area of a few overside berths and anchorages, and the transfer of cranes, dock railway engines, electric trucks, barges, etc.

Efficiency of Traffic Movement the Major Problem

The major problem of increasing the efficiency of traffic movement through the ports, by closely unified transport arrangements, has barely been touched. In France in 1916, an identical problem was solved by the amalgamation of all forms of transport under Sir Eric Geddes, then Director-General of Transportation, and similar methods were adopted when the British Expeditionary Force was in France in this war.

In these French ports accommodation was limited, the equipment was not all up to the required standard of efficiency, and there had been very great congestion. (During 1917-1918 the tonnage handled by the new organisation in some of these ports exceeded 200,000 tons per week). Boulogne, Calais and Dunkirk were subject to regular air raid interference and the last-named to

bombardment by artillery. Yet the needs of the army were adequately met. The records showing how this was done do not appear to have been consulted. What was possible in France in 1917-19 is possible under the more favourable conditions in this country, and the requisite experience and skill is available if it is given the opportunity and power to function. If the departments refuse to profit by the experience of their predecessors, it may be in the interest of the nation to replace them by those who understand the business of dock working in relation to transportation requirements.

Need for Early Decision

A decision must be taken quickly. There is no time to increase the fixed berthing accommodation at those ports which are subject to least enemy interference. But the need to equip them to full capacity, and to apply methods to increase their effectiveness, is urgent if the war effort is not to be impeded. What is the use of the multiplication of the sources of armament supplies in America if the Ports of Britain are incapable of handling those supplies? How are we to deal with the situation likely to be caused by invasion? The dock problem is an integral part of the transportation problem, and both are part of the supply problem. The War Cabinet must take into consideration the transit of goods by the transportation system of this country as part of the strategy of the defence of Britain now and not after the multiplied congestion has produced chaos.

Recent Appointments

While this Bulletin was in preparation the Minister of Transport announced that two Regional Port Directors had been appointed, one for the North-west Region and one for the Clyde Region. Their functions are:—

- (i) To co-ordinate port activities within their regions in order to secure the most rapid clearance from the ports, whether inward or outward bound;
- (ii) the quicker turn-round of ships; and
- (iii) the best utilisation of available transport facilities.

These appointments are a step, and only a short step, in the right direction, but these Directors can only function effectively if there is a corresponding unification of the transport services themselves, that is if, with a measure of greater unification of demand, there is a real co-ordination of supply of transport. It cannot be too often emphasised that the system of internal communications must be considered as a whole. The greatest efforts of the most experienced officers with purely local functions can be utterly frustrated by action in distant parts of the country, without anybody whatsoever being able to relate cause to effect. One of the Directors covering the most vital Region of all comes to a highly technical and complicated job without any previous experience of transport or dock work. While everybody will wish him well in a formidable post, and will be glad to help him, the very choice of a man without suitable experience makes it only too clear that the nature of the transport problem is not yet understood. Failure to combine the highest professional experience with power and responsibility is the root cause of the situation which the appointments are intended to correct.

Ancient Harbours*

Being the Presidential Address of Sir Leopold Halliday Savile, K.C.B., to the Institution of Civil Engineers, November, 1940

(Concluded from page 85)

Roman Harbours

"Italy," wrote Mr. H. Stuart Jones, "is not furnished by nature with many good harbours. The estuaries of her greater rivers—the Po and the Tiber—are subject to rapid accumulation of alluvial deposit, and some of her natural roadsteads, such as Antium, are rendered unfit for remunerative harbour works by reason of their shifting sands. Few are the harbours such as Brundisium, where a safe anchorage is provided by natural spits and promontories. The Romans were therefore obliged to face technical problems of no small difficulty when their growing commerce demanded effectual shelter in the ports of Italy." The Romans were essentially practical people, and in dealing with those technical problems they introduced many new methods, among which the most outstanding were the use of the arch, the

terest. Four different methods are described. In the first case, where a masonry dam had to be made in the sea, he advised a cofferdam made of oak piles bound firmly together with chains. When this was finished the bottom was to be levelled and cleared, and a platform of beams laid upon it. The whole space above this was to be filled with stones embedded in a mortar composed of two parts of hydraulic cement to one part of lime. Next he discusses what should be done in places where hydraulic cement is unobtainable. In this case a double cofferdam should be built and the spaces between the walls of each cofferdam filled with clay in wicker baskets, tightly rammed down to make them watertight. The interior was then to be pumped dry by means of water-screws and water-wheels, and, if the bottom were hard ground, a concrete wall composed of stone, lime, and sand was to be built upon it,

the lower portion being made wider than the upper. If, however, (and this is his third method) the ground at the bottom was soft, the foundation had to be prepared by putting down a layer of piles of charred alder and olive-wood filled in with charcoal. On this the outsides of the walls were built of squared stone, with the longest possible joints, so that the middle stones might be well tied together by the bedding. The middle was filled with rubble or masonry work. In a very difficult passage, he describes a fourth method, to be employed when it was not possible to use cofferdams owing to the violence of the sea. A mound was built out as far as possible, at the end of which small walls, springing from just below the water, were built up to the level of the top, forming an empty space between themselves and the slopes of the mound. This space was filled with

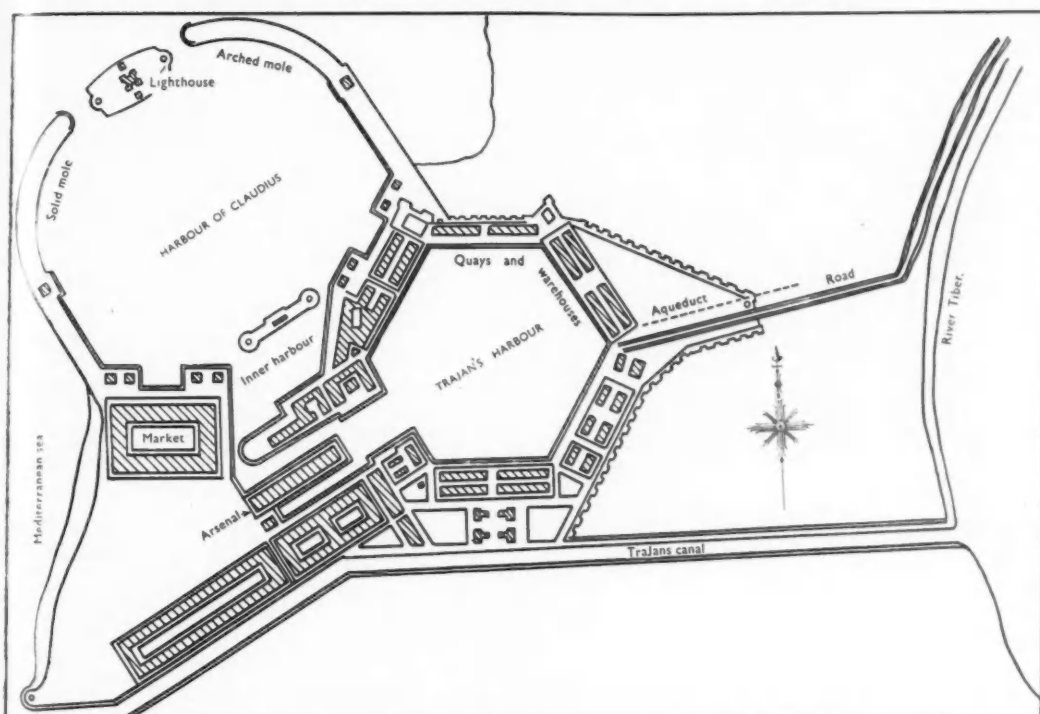


Fig. 14. The Claudian and Trajan Harbours of Ostia.

cofferdam, hydraulic cement (pozzuolana) and the driving of piles in deep water. The discovery of pozzuolana in the third century B.C. brought about a radical change in building and civil engineering structures. "Mixed with lime and rubble," wrote Vitruvius, "it not only furnishes strength to other buildings, but also when piers are built in the sea, they set under water and can be dissolved neither by the waves nor by the power of the water." The Egyptians, as I have shown, used the cyclopic dry-stone structure; the Greeks used large ashlar masonry held together by iron dowels and lead; the Romans used their famous, almost everlasting concrete made of pozzuolana, lime and stone; and it was pozzuolana that rendered possible the erection of those gigantic vaulted structures found all over the Empire. Piles were used in bridge-work and foundations; but the great importance of pile-driving, so far as we are concerned at the moment, was that it enabled the engineer to make cofferdams for pier-building.

Vitruvius, in his treatise on architecture and civil engineering, *De Architectura*, written at the beginning of the 1st century, A.D., has a short chapter on harbour engineering at the end of the fifth book. His object was to deal with the methods by which ships could be protected against storms and tempests. After a reference to the usefulness of natural harbours, he explains the technique of building breakwaters by means of cofferdams (*arcae*). In the last section of the chapter he states that shipyards should have a northern aspect whenever possible, because southern aspects, owing to their warmth, generate dry rot, *tinea*, *teredo*, and other kinds of noxious creatures. In any case, he says, wood should be used as little as possible on account of its inflammable nature. His remarks on the construction of breakwaters are of considerable in-

terest. Four different methods are described. In the first case, where a masonry dam had to be made in the sea, he advised a cofferdam made of oak piles bound firmly together with chains. When this was finished the bottom was to be levelled and cleared, and a platform of beams laid upon it. The whole space above this was to be filled with stones embedded in a mortar composed of two parts of hydraulic cement to one part of lime. Next he discusses what should be done in places where hydraulic cement is unobtainable. In this case a double cofferdam should be built and the spaces between the walls of each cofferdam filled with clay in wicker baskets, tightly rammed down to make them watertight. The interior was then to be pumped dry by means of water-screws and water-wheels, and, if the bottom were hard ground, a concrete wall composed of stone, lime, and sand was to be built upon it,

the lower portion being made wider than the upper. If, however, (and this is his third method) the ground at the bottom was soft, the foundation had to be prepared by putting down a layer of piles of charred alder and olive-wood filled in with charcoal. On this the outsides of the walls were built of squared stone, with the longest possible joints, so that the middle stones might be well tied together by the bedding. The middle was filled with rubble or masonry work. In a very difficult passage, he describes a fourth method, to be employed when it was not possible to use cofferdams owing to the violence of the sea. A mound was built out as far as possible, at the end of which small walls, springing from just below the water, were built up to the level of the top, forming an empty space between themselves and the slopes of the mound. This space was filled with

*"Est in secessu longo locus: insula portum
Efficit objectu laterum; quibus omnis ab alto
Frangitur..."*

("There is a deep bay in a roadstead; an island forms it into a harbour by the shelter of its sides, which break every wave from the open sea.")

This, translated into an artificial harbour, presents us with the two incurving breakwaters of the Greeks, but with the Roman addition of a short protecting mole or island breakwater in front of the entrance, a type found in the important harbours of Antium, the Claudian harbour at Ostia, Centum, Cellæ, etc. (fig. 14).

There were, however exceptions to this rule. At Puteoli on the Bay of Naples, one mole originally protected the harbour. It was of a peculiar type introduced by the Romans, consisting of an arcade of fourteen arches resting on fifteen piers, each about 50-ft. square. The foundations of the piers were built of pozzuolana concrete, as laid down by Vitruvius, the upper portions being filled with fragments of tufa and brick. In addition to the mole there are also remains of a number of basins protected from the sea by a double row of piers; those in the outer row were rectangular and probably carried arches, whilst the inner piers, opposite the open archways, are trapezoidal in section. Caligula built a floating bridge from the end of the main pier across the bay to Cumæ, a distance of 2-3 miles, which probably had also the mili-

*Reproduced by permission from the Journal of the Institution of Civil Engineers.

Ancient Harbours—continued

tary object of protecting the upper end of the Bay of Naples against attack by sea.

The sand problem caused the Romans considerable trouble. Although some form of dredging is said to have been practised by the ancients in maintaining and deepening their irrigation channels, no record exists that it was ever developed sufficiently to enable them to use it to deal with silting in river-channels and harbours. The arcade form of breakwater was an attempt to use the tidal current to scour harbours, but usually failed in its purpose. The problem remained and silting drove the Romans from the harbour at Antium, and from the Tiber, and turned the magnificent harbour at Ostia into a failure. Speaking of the problem at the mouth of the Tiber, Sir John Rennie wrote, "Upon referring to the history of the shore, at the mouth of the Tiber we find that from the foundation of Ostia by Ancus Martius in 634 B.C. to the end of the Commonwealth in 82 B.C. the line of shore had advanced about 1,100 yards in 552 years; again from the Commonwealth to

that it would range from 15-ft. to 20-ft. at low water. The area was about 130 acres. At the upper end of this main basin was a smaller one 1,200-ft. long and 520-ft. wide, covering an area of about 7 acres. It was separated from the main basin by an island mole similar to that in the main entrance. A very large portion of the harbour was dug from the mainland, and it is said that this involved the excavation of 80 million cubic feet of earth. In spite of the vast amount of money and care expended on this work the harbour was not a success. Tacitus reports that 200 ships were sunk in the harbour itself during a storm in A.D. 62. Trajan (A.D. 92-117) added an inner basin, hexagonal in shape, with an area of about 70 acres. Claudius had dug two canals, running parallel to each other, connecting the harbour with the sea and the Tiber. To remedy this, Trajan took up part of one of these canals in creating his new basin and he filled up the other. He then dug a fresh canal, which has since become the mouth of the Tiber, the river having deserted its old course. The harbour was well provided with quays, transit sheds, and storehouses, some of which were finished, regardless of expense, with marble tiling.

The Roman engineers were right when they advised against building this harbour. The forces of nature were against it from the beginning, and to-day the remains of the great port of Ostia lie buried in sand a mile from the shore. The tendency must have begun to become obvious even in the reign of Trajan, for he took measures to provide a new harbour for Rome a little higher up the coast. The result was the harbour which, under its modern name of Civita Vecchia, is now the principal port of Rome. Centum Cellæ (fig. 15), to give it the name by which it was then called, was planned and built on precisely the same principles as those employed at Ostia, except that in it the island mole overlapped the ends of the main breakwater, instead of lying between them. The harbour, as its name implies, was provided with one hundred covered cellæ, or docks for warships (fig. 16).

Pliny the Younger, nephew of the naturalist, when staying with Trajan in the locality, visited the new port while construction was going on, and wrote a description of it in a letter to his friend Cornelianus:

"The house is most beautiful," he wrote; "it is surrounded by green fields and overlooks a bay where, at this very moment, a harbour is being built. The breakwater on the left side is already finished and is a work of great solidity. The one on the right is still under construction. In front of the entrance to the harbour an island is being formed, which by opposing the storm breaks the force of the waves and forms a safe passage for ships on each side. The construction of this island is a work of art that is well worth seeing. Enormous blocks of stone are brought in great barges and tipped, one on top of the other, into the water. Their immense weight and mass keep them steady and gradually they heap up and form an embankment. Already a ridge of rocks, which breaks the driven waves and throws them skywards in a cloud of spray, is beginning to appear above sea level. The crash of the foaming sea is tremendous. Piers will afterwards be built on the rocks and in the course of time the impression will be that of a natural island rising from the waters. This port will be named after its maker, indeed it has already been so named, and it will save, one may say, a multitude of lives; for this coast, which for a long stretch is without a harbour, will now have this one as a refuge for ships."

The Roman Empire was followed by a period of more than 1,000 years of quiescence, or even retrograde action, in harbour engineering. I know of no great harbours, such as those which I have

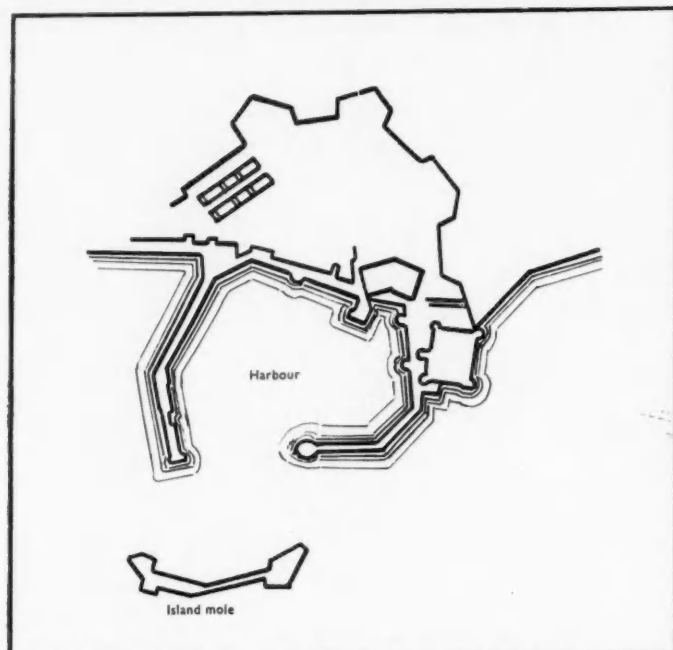


Fig. 15. Centum Cellæ Harbour.

the end of the Empire in A.D. 364, a period of 446 years, it had advanced also about 1,100 yards, and from the Empire to the present time, being a period of 1,400 years, it has advanced 2,550 yards, making a total distance of about 3 miles 600 yards in 2,480 years; and a projecting delta is formed at the mouth of the Tiber."

Many efforts were made to keep the Tiber open below Rome by revetting the banks and controlling the channel to induce scour, but all in vain. Gradually all shipping, except boats of the shallowest draught, was forced down to the lower part of the estuary, whence goods had to be transferred by barge to Rome. A great deal of the trade was transferred to Puteoli, which came to be regarded as the Port of Rome and rose to the position of the premier commercial harbour of Italy; but its distance of about 140 miles from the metropolis, along the Via Appia, formed a serious inconvenience in view of the slowness of transport in those days. Moreover a safe harbour near by was needed to accommodate the fleet which had the duty of guarding the mouth of the Tiber. Caesar realised the urgency of the problem and proposed to build a new port, but he was prevented from doing so by the objections of his engineers. In A.D. 43 Claudius overruled these objections and gave orders to proceed with the work (fig. 14). A spot was chosen on the sea a short distance north of the river-mouth, and the place was called Ostia, after the town which had been the centre of the port works of the river harbour. This harbour had two basins. The outer was formed by two artificial moles, each 1,900-ft. long and 180-ft. wide. Both moles ran out almost at right angles from the shore for nearly half their length, and then curved inwards, leaving a space of 1,100-ft. between their extremities. Immediately in the centre, and between the extremities, was an isolated mole, 780-ft. long by 400 ft. wide, leaving an entrance of 160-ft. on either side. To form this mole the ship which had conveyed a huge obelisk from Alexandria to Rome for Caligula's Circus was filled with concrete and sunk. Great concrete masses were then piled on the top of it until the mole reached the surface. A lighthouse after the model of the famous Pharos of Alexandria was built on this island mole. The circular part of the main northern breakwater was constructed upon arches in the hope that the current would prevent accumulations of sand. The southern breakwater was solid throughout, to prevent the entrance of drifting silt and sand from the mouth of the Tiber. The depth of water in the basin is unknown, but Sir John Rennie estimated

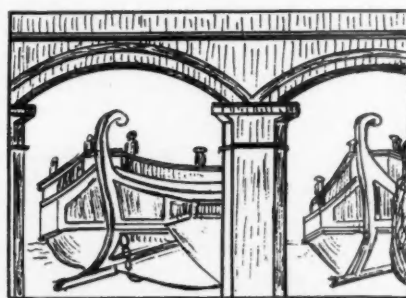


Fig. 16. Cellæ at Centum Cellæ.

described, that were built during the dark periods of the Middle Ages. We have to wait till the great engineering revival that began about the middle of the 18th century before we find such ambitious schemes again attempted.

It is, however, interesting to study the debt we owe to the ancients. The similarity of their treatment of problems to the methods of the modern engineer is, as I have tried to show, in many cases very remarkable. I have touched only the fringe of the subject, but that has been sufficient to convince me that it is one well worth deeper study and research.

Bombay Port Trust and the Recent Disastrous Storm

The following statement was made by the Chairman at the meeting of the Board held on 28th October, 1940, regarding the storm that occurred on the morning of 16th October:—

Various telegrams regarding unsettled weather off the Konkan Kanara and Malabar Coasts had been received during the week preceding the storm; but these telegrams only advised the hoisting, lowering and re-hoisting of Distant Cautionary Signal No. 1 which means that ships leaving the port might run into danger.

The first intimation that the port and the shipping therein might be affected was received at 10.45 p.m. on the 14th and was to the following effect:—

"Depression probably formed East Central Arabian Sea. Replace present signal by Local Cautionary Signal three."

Accordingly Signal No. 1 was lowered and No. III hoisted. The definition of No. 3 is "The Port is threatened by squally weather."

At 1.25 p.m. on the 15th the following telegram was received:—

"Deep depression centred within 100 miles of lat. 16 long. 70 moving some north-easterly direction."

No instructions were received at this time to hoist Signal IV; but in view of the information contained in this telegram it was considered advisable to warn all ships in the Port. Ships at anchor in the stream were advised of the Storm Warning in writing and also advised to take due precautions that they were securely moored and to raise steam at short notice if weather conditions required it. The Port Trust tug "Doris" was despatched at 5 p.m. with a Harbour Police Naik on board to warn all country craft in the anchorage that stormy weather was expected and that they should make their craft secure or shift it if that was necessary. It may be emphasised that this action was taken as a precautionary measure although the signal did not warrant it.

At midnight on the 15th the following telegram was received:—

"Deep depression probably storm centred seventeen hours with degree of latitude seventeen longitude seventy-one moving north-easterly direction. Hoist Local Warning Signal Four."

The definition of No. 4 Signal is that "the port is threatened by a storm but it does not appear that the danger is as yet sufficiently great to justify extreme measures of precautions." The extreme measures so far as the country craft are concerned is their removal from the stream and berthing in the Docks. The receipt of this telegram at midnight rendered taking these measures impossible. The Prince's and Victoria Docks which are the most suitable docks into which country craft could be transported being tidal, the gates were closed at midnight*. The storm gates at Alexandra Dock were closed much earlier at 9.45 p.m. It was therefore impossible to take the craft into shelter. I might mention that several barges, small launches and some country craft were taken in the Prince's and Victoria Docks when the gates were opened at 7.20 a.m.

Further messages indicating the approach of a storm of slight or moderate intensity and a storm of great intensity were received respectively at 6 a.m. and 9 a.m. on the 16th but long before this the storm had struck the port.

It will be seen from the foregoing, the action taken was in advance of that prescribed by the telegrams received. The fact that great loss of life and property resulted from the storm, was due to the warnings of danger being received too late to enable effective action to be taken and to the Prince's and Victoria Docks being tidal.

Life-Saving Equipment

The other point to which criticism has been directed is with regard to life-saving. So far as our Docks and Bunders are concerned, they are provided with life-saving equipment in the shape of buoys and lines. Full use was made of this equipment wherever necessary.

It is not necessary to cite each case; but I shall quote a few instances. Assistance was rendered to 18 men at the Sassoon Dock. Our staff at the Lakri Bunder with that of the B.I.S.N. Co. helped to rescue about 30 men by means of ropes and a life-buoy. Similarly at the Brick and Hay Bunders our staff assisted by the staff of the Tata Oil Mills rescued about 50 men by means of ropes. The staff at the New Ferry Wharf helped in rescuing the crew of a coal barge sunk there. Five men were saved at the Malet Bunder; and 40 men and 1 boy were rescued from sunken craft at our workshops at Mazagon. At the Tank Bunder 32 men were rescued from sunken craft. I might mention that 200 men were given shelter during the day and 140 men at night in the workshops. These men were fed from funds raised on the spot by workshops staff. For this and similar life-saving work elsewhere I fear our staff have not received the credit that is due to them or in fact any credit at all.

*High tide. Gates opened at half tide and closed at top of High Water.

What has perhaps overshadowed this work is the fact that little assistance could be rendered in the early stages of the storm to the crews of boats that came to grief at some distance from the shore where they were not within the reach of our lines. But it must be frankly admitted that the Port is not, and except for a brief period and to a very limited extent it has not been, equipped for rescue work of this nature.

I understand that life-boat stations existed at Colaba and Kennery Island in the past but since their abolition in or about 1890 no provision for life saving has existed in Bombay except to the limited extent just referred to. It appears that in 1929 while considering the question of replacing one of the steam launches it was suggested that it might be replaced by a new motor vessel which, apart from her utility as a tender, might be used for life-saving purposes. The craft in question, namely, "Catherine," was however scrapped in 1936 and since then no provision whatsoever for a life-boat service in the harbour has been made.

It is no use speculating now on what might have happened if we had been equipped with a proper life-boat service. But I might mention that the craft which came to grief falls into three categories:—

- (1) Fishing boats that put out to sea before the storm;
- (2) Boats that were not able to enter the harbour at night;
- (3) Bunder boats and country craft anchored in the harbour.

It seems to me very doubtful whether any reasonable life-boat service which could be maintained by this Port would have been of any material help to the first two categories. With regard to the third, this was not the case of one or two vessels in distress but the whole country craft in the harbour getting out of control and being driven towards the shore. Against such a contingency, no adequate provision could be made. But I might mention that the "Rose" and "Doris," the only craft available or suitable for rendering assistance to craft in the storm both got under way when the storm struck the port. The "Rose," owing to her deep draught was of no value, and the "Doris," although of less draught, got into trouble herself while rendering assistance to country craft in the vicinity of Prince's and Victoria Docks. She subsequently came into the Victoria Dock but was again despatched to render further assistance possible and save anyone in the water or stranded on craft. The "Rose" was also despatched to render assistance in deeper waters in the harbour. The "Doris" saved 7 men. As soon as the sea moderated the motor launch "Teal" was sent to search the south water point and the "Mora" the north water point. The "Teal" was instrumental in towing several country craft into the Bunders.

The Volga-Baltic Waterway

(COMMUNICATED).

The construction now in progress of a deep waterway between the Volga River and the Baltic Sea, is of considerable economic importance to the Union of Soviet Republics. It involves a re-modelling of the Mariinsk waterway from Leningrad to Rybinsk on the Volga, which has a total length of 711 miles. The Mariinsk system comprises the Neva, the Lagoda Canals, the River Svir, the Onega Lateral Canal, the River Vitegra, the Novo-Mariinsk Canal, the River Kovzha, the Beloye Lake by-canal and the River Sheksna. The sector from Leningrad to Lake Onega of the Volga-Baltic waterway is known as the marine sector.

The Mariinsk water system has 52 sluices, 33 weirs, 429 bridges, many flood gates, spillways and other structures. The sluices are mostly wooden ones. The dams, with the exception of those on the Sheksna, are also wooden. The time it takes for cargo vessels to come from Leningrad to Rybinsk on the average is 30 to 40 days, but sometimes it takes as long as 50 to 60 days. Moreover, the waterway is only navigable by small vessels of shallow draft. On account of the rapids on the Svir River, the Mariinsk system in essence is not a through waterway from the Volga to the Baltic Sea. As it is to-day, the system is unable to cope with the growing volume of cargo that has to be carried by water, and the economic development of the regions dependent on it is therefore retarded. The necessity for reconstructing the Mariinsk water system also arose as a result of the building of the Uglich and Rybinsk hydro-electric power centres on the Volga.

The Mariinsk system is a natural continuation of the Baltic-White Sea Canal. Much greater volumes of cargo could be carried over the canal if the Mariinsk system were made more suitable for navigation. Hence, the present work on the reconstruction of the Volga-Baltic waterway. Work on the sector from the Rybinsk reservoir to Lake Onega is expected to develop shortly. Some 20,000 men are engaged on the undertaking.

The reconstruction of the Volga-Baltic waterway is scheduled for completion in 1943. Then the Baltic Sea will be linked up with the Volga by an uninterrupted deep-water route, suitable for navigation by vessels of large capacity; the time required to cover the route will be reduced to one-third and the volume of freight carried will be increased manifold.

Proposed Large Dry Dock at the Port of New York

Report on the Proposal by the Port of New York Authority

(Concluded from page 78)

THE DESIGN AND PLAN—(continued).

The following equipment is provided:—

Pumping Plant.	Caisson Gate
Blocking	Capstans
50-Ton Dock Crane	

The main features of the power supply and other services are as follows:—

The main pumps will operate on a feeder circuit direct from and at the voltage of the outside power supply and will be A.C. 3-phase, 60-cycle. One 440-volt, 3-phase, 60-cycle A.C. circuit will serve the smaller pumps in the pump well. Another 440-volt Circuit will serve all the capstans and the pumps in the caisson gate. A separate circuit will provide lighting for the grounds.

Power service in the dry dock will include power for welding, and 220-110 A.C. power and lighting service on both sides of the dock. For other services, outlets on one side of the dock only would appear to be adequate. The amount indicated is the total available and will be delivered to at least four points in the side wall of the dock above the service altar. One-half of the full capacity will be available at any one point. Electric power for welding, miscellaneous power and lighting service and direct current will also be available at the 1,200-ft. berth, but 440-volt A.C. power for ship service is not contemplated. Compressed air and fresh water service will also be available at this berth.

The total capacity of the various services to be supplied to the dry dock are recommended as follows:

800 K.V.A.	Ship Power—A.C. 440-volt, 3-phase, 60-cycle.
225 K.V.A.	Miscellaneous Power and Lighting—A.C. 220-110-volts, 4-wire, 60-cycle, 3-phase power and single-phase lighting.
600 K.V.A.	Welding—A.C. 220-volt, 3-phase, 60-cycle.
600 K.W.	Ship Power—D.C. 220-110-volts, in two units.
Compressed Air	3,000 cu. ft. free air per minute at 100 $\frac{1}{2}$ in two units of 1,500 cu. ft. each.
Steam for Heating	300 boiler h.p. in one unit.
Salt Water	500 gallons per minute, 100 $\frac{1}{2}$ head for fire protection and cleaning dock.
Fresh Water	Capacity as required.
Telephone	10 stations, signal system for dry dock pump well and caisson plus trunks to ship from local exchange.
Sub-station, etc.	A building about 50-ft. by 80-ft. is contemplated to house the two air compressors, the two motor generator sets, the switchboard and the heating boiler.

As has been stated, close estimates cannot be made of the probable cost of the improvements or judgment passed as to the suitability of the sites until much more complete information as to sub-soil conditions is available. For the purpose of determining probable limits of cost and more particularly probable relative costs on one site as compared with another, two outline designs have been prepared, one with the dry dock founded on rock and the other for sites which cannot be satisfactorily unwatered, such latter design being similar to the design employed by the Navy Department in the construction of two dry docks at Pearl Harbour, Hawaii, and one at Mare Island, California. This design is also of the same type as that used in the construction of a dry dock for the Robins Dry Dock and Repair Company at Erie Basin, Brooklyn.

LOCATION.

Under such legislation as may be enacted the exact site upon which the dry dock is to be constructed must, obviously, be subject to the approval of the Secretary of the Navy. The Navy Department specifies one fundamental requirement for location—such a dock must be placed below the suspension bridges.

The proper location of the dock is controlled by general factors which, for the most part, are the same as those which existed at the time of the preparation of the Port Authority's 1928 report. The site should have frontage on deep water, should be safely accessible from the viewpoint of navigation, should have railway, highway and public utility connections, and should be convenient to a normal labour supply. For a graving dock, rock foundations are desirable but not so near the surface as to result in high construction costs and high dredging costs for approach channels.

It is desirable that the site finally selected should, if possible, be sheltered from the prevailing winds and from the blockage of drift ice. In handling a big battleship or merchant ship to and from dry dock, plenty of channel room for docking is required clear of heavy marine traffic. Narrow channels, shoals, swift tidal currents or any other obstructions to navigation are undesirable.

For those locations which would require the construction or reassembly of a ship repair plant, it is also necessary that the site embrace sufficient acreage for the convenient location of those facilities. This requirement is essential at all sites which do not adjoin an existing ship repair plant.

All of the readily available data regarding site study have been secured and carefully examined, especially as respects character of sub-soil, depth of water, location of rock and probable rock contours. Detailed borings will have to be made before any close estimates can be prepared of probable cost, or before any final judgment can be passed as to the suitability of the several sites. It is estimated that these borings, detailed plans, studies and other work requisite to the preparation and submission of a final and formal proposal will require certain additional expenditures, in addition to what has already been spent by the Port Authority in the present studies and in the preparation of the present report. The Port Authority is not in a position to make further advances toward the completion of studies leading to a final and definite proposal. The necessity of a Navy Department advance for such purposes will be discussed hereinafter in the section of Legislation.

Within the time available and with the lack of information as to sites it has been possible only to make tentative layouts for each of the locations discussed in this report. During the course of this work suggestions have been received from various sources which indicate that improvements in such layouts can very likely be made which may result in more efficient and economic use.

Eight possible sites within the harbour of New York and below the suspension bridges have been studied and are indicated on the map of the port area which appears on the next page. Three are adjacent to existing ship repair plants and the other five have sufficient area for the construction of a new ship repair plant including the requisite number of floating docks. The three sites adjacent to existing ship repair plants are the site directly north of the 56th Street yard of the Bethlehem Steel Company in Brooklyn, the site at Erie Basin in Brooklyn, adjacent to the Robins plant of the Todd Shipyards Corporation, and the site alongside the Tietjen and Lang Plant of the Todd Shipyards Corporation in Weehawken.

The utilisation of any one of the five sites which do not adjoin existing ship repair plants will involve the acquisition of sufficient area to permit the location and construction of the requisite shops, storehouses, piers, berths, and water basins. In addition, any prospective tenant would probably require space for smaller dry docks, probably of the floating type. In fact, our investigations and preliminary discussions indicate the desirability of selecting a site which, in addition to space for the installation of a ship repair plant, will adjoin a further available area which the tenant or tenants might wish to develop on their own initiative as ship-building plants.

COST.

Within the time and resources available it has obviously been impossible to develop close estimates of cost. The lack of accurate data on foundation conditions and the impossibility of getting together anything more than "horseback" real estate appraisals have been the principal obstacles to accuracy.

The real estate figures represent simply the results of casual inquiry and reflect, in large measure, the prices at which these properties are held, rather than analysis of their comparative real estate values. In each case it is felt that the property can be purchased or condemned at a final figure *inside* the estimate.

In considering cost, it should also be borne in mind that a higher cost at one site may be counter-balanced by the existence of an adjoining ship repair plant, and that a low cost at another may be outweighed by the cost to the operator of constructing or reassembling such a plant at a new location. As will be apparent from the succeeding figures, however, the wide variations in cost reflect the differences in foundation conditions, cost of channel approaches and the tremendous variations in the cost of the real estate. The estimates of the principal items of cost for the foregoing eight sites, other than real estate, lie between the following limits:—

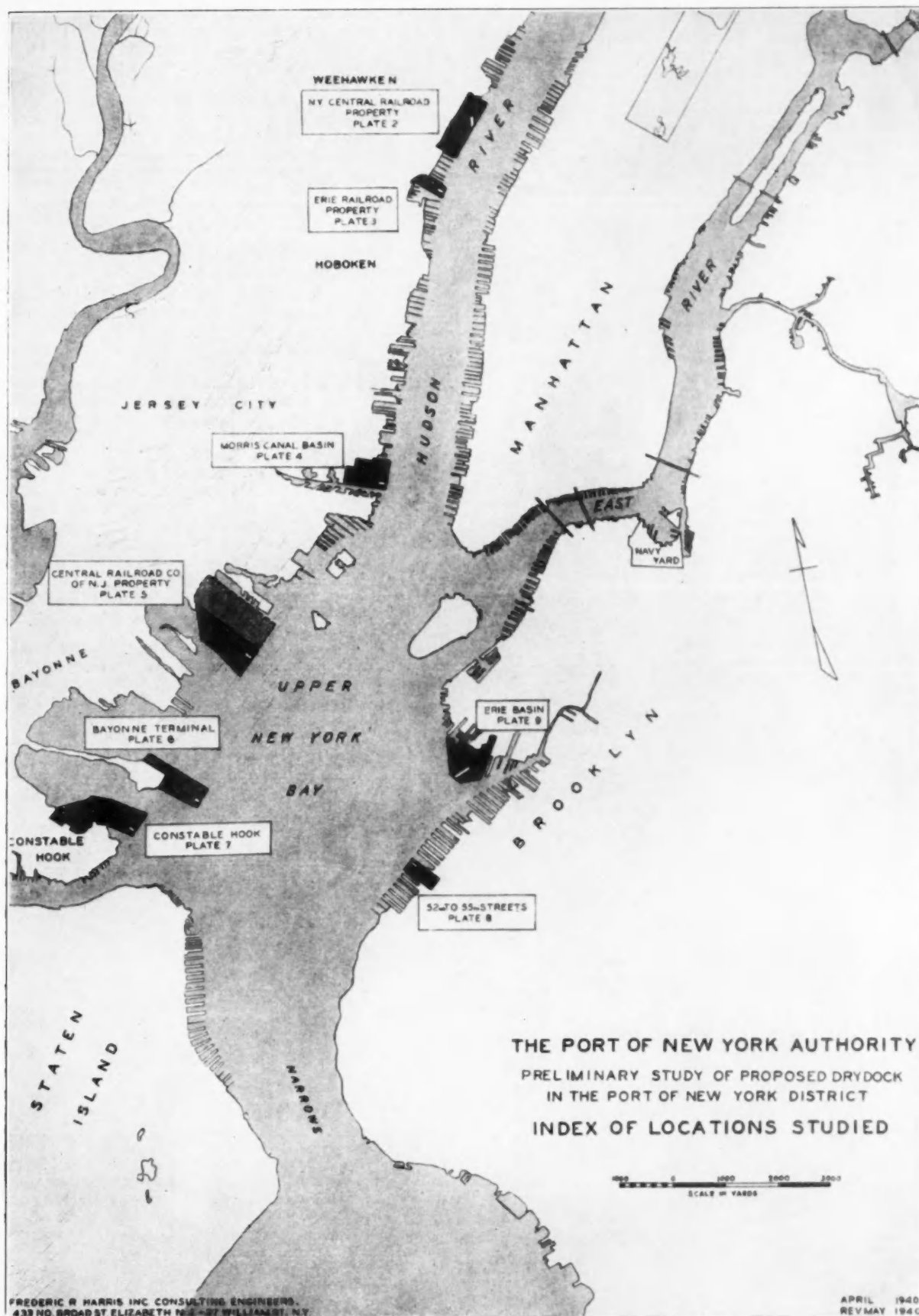
	\$	\$
1. Dry dock, Structure, including Foundations	4,300,000	to 8,860,000
2. Berth (Pier or Basin), Bulkheads, General Filling, Removal of Structures	860,000	to 4,200,000
3. Channel Approach	55,000	to 3,120,000
4. Equipment and Services	1,660,000	

There are five of the eight sites discussed in the foregoing pages which reflect total estimated costs, including real estate, of from

Proposed Large Dry Dock at the Port of New York—continued

\$11,600,000 to \$14,300,000. A federal grant in aid, not to exceed \$7,000,000, on the indicated cost of the project on any one of these five sites, would therefore require a rental sufficient to carry a bond issue of from \$5,800,000 to \$7,300,000. With a 3% coupon, amortization over a period of 50 years, and the overhead charges

These estimates include the purchase of the entire site, including not only the area actually occupied by the dry dock structure and berthing pier, but also the cost of the dry dock and its accessories, including equipment and services, berthing space, basin or pier, and channel. In the case of sites which do not adjoin a



Note.—Since the date of this Report, the site at Bayonne Terminal has been selected for the New Dry Dock.
The Plates referred to in the Location Plan are not reproduced.

for the Port Authority's administration and supervision kept to a minimum, it might well be possible for a ship repair company to meet such rental.

On the three remaining sites, however, our total estimate costs run from \$15,700,000 to \$17,800,000.

repair plant, they include sufficient area for the accommodation of such a plant. Other than the facilities heretofore itemised in the section on Design and Plan, they do not include any of the structures, plant or equipment that will be required for the establishment of a ship repair plant; nor do they include any of the

Proposed Large Dry Dock at the Port of New York (continued)

area that might be required in the event that the ultimate development included the establishment of a shipbuilding plant.

Although the business of ship repair and shipbuilding are not generally regarded as mergeable, the lack of such a dock in the port to-day gives rise to the possibility that these two marine industries might well consider the joint rental of such a facility. The desirability of such a dock to the ship repair business has heretofore been fully discussed. But there is not a private shipbuilding company, either in the New York area, or elsewhere, which is presently equipped to bid on the new 45,000-ton battleships. Yet, three of the sites considered obviously have an area sufficient to accommodate not only the dock but a complete ship repair plant, and a shipbuilding plant too. The possibility of a joint undertaking along these broad lines should not be overlooked.

May, 1940.

APPENDIX. (February 18th, 1928)

Report of the need for a Dry Dock at the Port of New York of sufficient size to accommodate the largest ocean steamships.

CONCLUSIONS.

(A) As to Need:

1. There is universal demand on the part of steamship companies for a large dry dock at this port.

2. There are 15 large vessels now entering the port, and more being planned and actually under construction, which cannot be dry docked at existing commercial facilities.

U.S. Naval dry docks at Brooklyn, N.Y., will accommodate 5 of the above 15 vessels, but the use of the Naval facilities is limited to emergencies and is restricted to such times as the facilities are not needed for Navy work. In addition a permit for commercial use is necessary from the Secretary of the Navy. Location of the Brooklyn Navy Yard, on the East River above the Brooklyn and Manhattan Bridges, makes it difficult for many big ships to reach it.

3. Foreign flag vessels normally dry dock in their home ports and do and would use American dry dock facilities only in emergencies.

4. Repair costs are cheaper abroad and crews can be laid off in home ports if repair period is of any duration. The probable amount for such emergency use is impossible to estimate.

5. At least one commercial dry dock company in this port is planning to enlarge its dry dock facilities immediately and when so enlarged will be able to dry dock all but 9 of the above vessels. Only one of these 9 will be an American ship.

6. As a matter of national port policy New York should have a dry dock capable of accommodating the largest vessel entering the port. The nearest such facilities on the Atlantic seaboard are at Boston, Philadelphia and Norfolk.

(B) As to Location:

1. A large dry dock should be located reasonably near the usual berths of the largest vessels—which are on the North River.

2. Taking into account channel, ice, storm and tide conditions, the Westerly or New Jersey shore of upper New York Bay and the Hudson River between Bayonne and Fort Lee seems to offer the most desirable locations.

3. Locations are available in Bayonne, Jersey City, Weehawken and North Bergen but no specific location can be recommended without thorough engineering surveys.

(C) As to Cost:

1. The cost of a suitable dry dock on the above waterfront will be between ten and twelve million dollars, depending on type of dock, foundation conditions at site, and amount of dredging.

2. It has not been possible to estimate the cost more closely within the time and funds available.

(D) As to Facilities and Appliances:

1. The facilities and appliances necessary for a bare dry dock, without repair facilities, include a power house, pumps for unwatering dock, crane, keel and bilge blocks, shoring timber and miscellaneous gear and tackle. Their cost is included in the above general estimate.

2. It does not appear desirable to plan for any shop equipment or permanent repair facilities in advance of determination of the method of financing and operating. Existing shipyards have ample shop facilities for any reasonable increase in repair work.

(E) As to Financial Feasibility.

1. The volume of business which a large dry dock at The Port of New York would attract at present appears to be insufficient to make it financially self-sustaining. In other words, it probably will not pay as a commercial proposition.

2. It will probably be necessary to finance the construction of such a facility by and with the aid of public funds.

3. Revenues to meet capital charges might be secured in whole or in part from one or more of the following sources:—

- (a) Guarantees of annual use, or minimum payments in lieu thereof, by steamship companies.

- (b) Guaranteed minimum use, or an annual subsidy from department of the Federal Government, either the Navy Department or the Shipping Board or both.

- (c) By leasing the completed facility, on the basis of competitive bids, to some ship repair company at the port.

4. Determination of financial feasibility must necessarily wait on determination of construction cost which in turn must wait upon determination of type of dock and location.

5. The time has been too short and funds not available for adequate investigation of these important matters. Surveys of available sites, including subaqueous borings; estimates of costs of different types of docks at different locations; analysis of cost of operation and maintenance; the determination of sources and the amounts of potential revenues and preparation of a plan for financing; would require additional time and will cost about \$50,000.

Port of Dublin

Chairman's Annual Review

Capt. Alan Gordon, outgoing Chairman of the Dublin Port and Docks Board, reviewed the work of the Board during 1940 at the last monthly meeting.

He stated that the tonnage of vessels arriving from foreign ports during the year had been 417,161, a decrease of 282,948 on 1939, while cross-Channel and Continental tonnage, at 1,491,171, had shown a decrease of 582,036 tons, making a total tonnage decrease of 864,984. The tonnage of liners anchoring in the Bay had been 6,637, a decrease of 18,413.

Tonnage dues collected amounted to £77,267, a decrease of £11,158. There was a total increase of £6,496 in the dues collected on goods, the figures being—inward traffic £86,822, and outward traffic £25,241.

"During the last year," added Capt. Gordon, "the position of the emergency has considerably extended. As a result, commodities which flow to the port of Dublin for the country's needs have considerably changed in character, and, in almost every instance, changed in origin.

"This, and the restrictions which the emergency has placed on merchants obtaining their supplies and on shipowners operating their ships, has had the effect of reducing the total net register tonnage which has entered the port and made use of the quays and equipment."

He was satisfied that the finances of the Board were sound and had been soundly managed, but the balance of receipts over expenditure on revenue account this year was in the neighbourhood of only £4,000-£4,500, as against £13,400 at the end of 1939.

During the past year endeavours had been made to reduce expenditure, so far as was possible in face of rising costs and diminishing income.

All capital works—unless such as had to be completed—had been discontinued.

The oil refinery project had been held up. At the moment he did not take a very optimistic view of an immediate resumption of the project.

To assist in economies, it was decided to discontinue double-shift dredging, and, while the navigable channel had been well maintained, the quantity dredged had fallen from 1,884,000 tons to 1,403,000 tons.

The first section of the ocean pier at Alexandra Quay extension had been commenced—showing an additional 110-ft. The North Bank Lighthouse had been put in commission as a new automatic light, and the old lighthouse demolished—this being a saving in annual expenditure.

Considerable A.R.P. work has been done, and, with the approval of the appropriate Government authority, shelters, fire equipment, and other matters were well in hand.

Publication Received

A copy has reached this office of "Transportation Lines on the Atlantic, Gulf, and Pacific Coasts," issued by the Board of Engineers for Rivers and Harbours as Transportation Series No. 5. The reports in this series contain information covering shipping conditions and transportation as affecting the use of U.S.A. water routes and ports.

The present report, the price of which is 50 cents., gives information concerning the transportation lines and cargo-carrying vessels operating on the Atlantic, Gulf, and Pacific Coasts and their tributary waterways, except the Mississippi River System. Similar reports were published on Transportation Lines operating on the Great Lakes in 1935 and on the Mississippi River System in 1936.

Copies of this report may be obtained on application to the Superintendent of Documents, Government Printing Office, Washington, D.C.

Dock and Harbour Authorities' Association

**Report of the Executive Committee for the Year ended 31st December, 1940, presented to the Association at the Annual General Meeting held on 26th February, 1941*

The Committee present the Twenty-first Report of the Proceedings of the Association.

Meetings

The last Annual Meeting was held in London on the 21st of February, 1940. The Executive Committee have met only four times and Sub-Committees seven times during the year, owing to difficulties arising out of the present emergency.

Representatives of the Association have attended a number of Meetings with Government Departments.

Twenty-eight Circulars on various matters have been issued to Members.

Executive Committee

The Committee for the eleventh successive year elected Lord Ritchie of Dundee, the Chairman of the Port of London Authority, as their Chairman.

The Committee record with deep regret the death in October of Mr. George W. Service. Mr. Service had been a member of the Clyde Navigation Trust since 1905, and represented the West Coast of Scotland on the Executive Committee of the Association continuously for the last 14 years.

Mr. A. Blacklock retired from his position as General Manager and Secretary of the Tyne Improvement Commission at the end of June. The vacancy on the Committee was filled under Rule 7 (1) (E) by the appointment of Mr. J. K. McKendrick, his successor as Secretary of the Commission.

Parliamentary Chairman

Lt.-Col. J. T. C. Moore-Brabazon, M.C., M.P., was appointed Minister of Transport early in October. The Committee are confident that he carries to his important position the best wishes of all the Members, and their thanks for the work which he has done for the Association as Parliamentary Chairman during the last nine years.

Bills in Parliament

The under-mentioned Bills were considered and amendments sought where necessary to protect the interests of Members.

Session 1939-40

(1) Public Bills which Passed into Law

	Royal Assent.
	1940.
Agriculture (Miscellaneous War Provisions) ...	March 21st
Finance	June 27th
Finance (No. 2)	Aug. 22nd
Merchant Shipping (Salvage)	July 25th
National Service (Armed Forces)	May 23rd
Old Age and Widow's Pensions	March 21st
Special Enactments (Extension of Time)	April 25th
Superannuation Schemes (War Services)	June 13th
Workman's Compensation (Supplementary Allowances)	Aug. 8th

(2) Public Bills which did not Pass into Law.

†Purchase Tax
War Risks (Insurance)

Present Session 1940-41

(1) Public Bills which Passed into Law

	Royal Assent.
	1940.
Railways Agreement (Powers)	Dec. 19th
Expiring Laws Continuance	Dec. 19th

(2) Bill Pending

War Damage

Agriculture (Miscellaneous War Provisions) Act, 1940

This Bill received the Royal Assent on the 21st March, and Section 17 contains the amendment sought by the Association which saves sluices belonging to Navigation, Harbour and Conservancy Authorities from control by Drainage Boards.

Courts (Emergency Powers) Act, 1939

The Ministry of Transport informed the Association that an Order in Council was in contemplation under sub-section (6) of Section 1 of the Act, to relieve the Railway Companies in respect of goods held by them as a transport undertaking, but not as common warehousemen, of the provision in sub-section (2) of Section 1 which restricts the selling of goods in default of payment of a debt except with the leave of the appropriate Court.

The Order would enable the Companies to sell goods in their custody as bailees property on which they have a lien. Action

was at once taken, with a view to getting the proposed Order widened to include the undertakings of docks and harbours.

The Order (S.R. & O. 1940, No. 836) was made on the 29th May, and covers undertakers carrying on road transport, water transport, canal, inland navigation, dock, harbour, and pier undertakings, as well as railways.

Finance (No. 2) Act, 1939—Excess Profits Tax Finance Act, 1940

As Members were informed by Circular No. 493 dated the 26th April, the Association raised three important questions under the Finance (No. 2) Act, 1939, by letter dated 11th April, with the Treasury.

Satisfactory assurances were received from Somerset House by letter dated 24th April (attached to Circular 493) on the first two points, namely, with regard to "set off of deficiencies" and "deferred maintenance." With regard to the third point "sinking funds" the Association was informed that the matter was under consideration.

The Association's submission on this point was as follows:—

"Seventh Schedule—Sinking Funds

Paragraph 13 of Part I of this Schedule provides that in computing the profits of a local authority in an accounting period from any trade or business, a deduction shall be made on account of the obligatory sinking fund charges in respect of the accounting period. The term "local authority" is not defined in the Act and it is doubtful whether a statutory Dock or Harbour Authority comes within this term although many Dock or Harbour Authorities are under as binding obligations as those of a local authority to provide sinking funds or redemption funds for the repayment of their borrowed money, and the Association has asked me to urge that a clause should be included in the Finance Bill of this Session making it clear that paragraph 13 will apply to statutory Dock and Harbour Authorities who are under such obligations."

Subsequently the Government met the position by the following provision which is now Section 33 (6) of the Finance Act, 1940:—

"(6) Paragraph 13 of Part I of the said Seventh Schedule (which allows a deduction for sinking fund purposes in the case of a trade or business carried on by a local authority) shall apply in relation to any trade or business carried on by a public authority in the case of which the following conditions are fulfilled—

(a) that it has no share capital; and

(b) that the interest on all its stock and other loan capital is interest at a fixed rate,

as it applies in relation to a local authority;

Provided that nothing in this sub-section shall be construed as authorising any deduction for an amount required to be raised for sinking fund purposes unless the requirement is imposed on the authority by or by virtue of an Act of Parliament."

Docks and Harbours—Government Control of Charges

In January, Sir Arthur Eborall, Rates and Charges Controller, Ministry of Transport, intimated that the Minister under the Emergency Powers (Defence) Act, 1939, Section 1, and the Defence Regulations, 1939, Nos. 55 and 56, had power to control any charges which may be made by Dock and Harbour Authorities whether within their statutory maxima or not, and he proposed to issue directions governing the matter.

The question was considered by the Executive Committee and by the Parliamentary and General Matters Sub-Committee at several meetings, and in reasoned letters dated 1st March and 19th April it was urged that control by the Minister of Charges below the statutory maxima which were to be increased within that maxima, should not be assumed.

It was pointed out that Dock and Harbour Authorities have special knowledge for determining at what level rates and dues should be fixed in the general interest, owing to their close touch with local affairs, and therefore they should be left with the full discretion which Parliament has entrusted to them to decide what should be the actual rates to be levied within the statutory maxima.

In the result, however, the directions were made substantially as submitted, but in sending the final draft Sir Arthur Eborall conveyed the following assurance:—

"In conclusion I desire to point out that the Directions to be issued do not in themselves involve the exercise of any control of charges. They merely provide that the Minister be kept fully informed in order that he may, if he considers any action necessary, carry out the duty which is laid upon him by the Defence Regulations."

Arrangement with the Government, December, 1920, for payment of Dock and Harbour Dues on and for Services in connection with Vessels and Goods in Government Service.

As was the case in 1939, a number of questions have been considered by the Committee in connection with the interpretation and application of the Arrangement of 1920.

*Slightly abridged.

†The provisions of this Bill were incorporated in the Finance (No. 2) Act.

Dock and Harbour Authorities' Association—continued

The following refers shortly to one of these cases; others are listed later under the heading "Miscellaneous":—

Ministry of Supply—Form of Certificate.—It was thought to be desirable that a standard form of certificate should be used by the Ministry of Supply in claiming rebate under the Arrangement.

Other Government Departments have adopted a form of certificate which although it may vary slightly between Departments is standard for each Department.

The under-mentioned form was settled with the Railway Executive Committee and submitted to the Ministry, and was subsequently approved:—

FORM OF CERTIFICATE.

I declare that the under-mentioned Goods or Stores imported into or exported from the Port of..... by the..... on the..... are the property of His Majesty's Government on importation or exportation and are for the direct use of the Ministry of Supply, and are not for sale or re-sale, or for any trading purpose, but will remain in continuous Government ownership, and as they are not railway materials or coal, coke or oil to generate heat or produce power, the abatement of 25 per cent. in dock and harbour dues is hereby claimed.

Admiralty Salvage Section—Removal of Wrecks and other Obstructions

As the Admiralty have taken control of a large part of the salvage plant and equipment of the country, Dock and Harbour Authorities are being faced with great difficulties in the exercise of their statutory powers and duties with respect to the removal of wrecks and other obstructions within the limit of their undertakings.

A great deal of work has been done in an endeavour to reach a satisfactory arrangement, and Members have generally approved a scheme which has been circulated under which the Admiralty Salvage Section will be employed as contractors by the authorities.

The Committee have dealt with a number of other matters which are not referred to here in detail, but are merely listed under the heading "Miscellaneous."

Full information can be supplied to Members on these matters on application to the Secretary.

Principal Circulars issued in 1940

- Arrangement with the Government, 1920—Ministry of Supply (Nos. 488 and 492).
- Finance (No. 2) Act, 1939—Excess Profits Tax (No. 493).
- Government Compensation for War Injuries (No. 495).
- Removal of Wrecks and other obstructions (No. 503).
- Schedule of Reserved Occupations (Nos. 484, 497 and 506).

Miscellaneous

Other matters which received attention during the year include the following:—

- Army Officers Emergency Reserve—Retention of Services.
- Arrangement with the Government, 1920.
- (a) Cased petrol shipped for War Office—dues on ship and cargo.
- (b) Admiralty Modification of Arrangement—Minor matters for local agreement.
- (c) Cranage charges reduction where grant made by Government towards cost of providing cranes.
- (d) Application of Arrangement to H.M. Vessels.
- (e) Rebate under Arrangement to be calculated on net dues after any ordinary remission has been made.
- (f) Application to Government of Australia and to the Dominion of Canada.
- (g) Vessels on time charter to Government—Form of rebate certificate.
- (h) Ships requisitioned at one Port and released from requisition at another—How is rebate to be apportioned?
- (i) Admiralty vessels passing to naval establishments within a Port
- (j) Dues on French troopships.
- (k) Dock rent—application of rebate.
- (l) Vessels of general Lighthouse Authorities—Rebate.
- British Standards Institution—Specifications—
 - (a) Round Strand Steel Wire Ropes for Lifts and Hoists.
 - (b) Manila Ropes for General Purposes.
 - (c) Sisal Ropes for General Purposes.

Canteens in Dock Industry.

Certificated Engineers—Supply for Navy.

Decorations for Gallantry—Dock and Harbour Employees.

Government aid to Ports in financial difficulties.

Membership of Harbour Board—Disqualification on ground of pecuniary interest in contracts.

Oil in Navigable Waters—Prosecutions.

Port and Transit Organisation—Expenses.

Protected Places—Extra Police—Fencing, etc.

Publication of Data of British Ports—Port Hand-books and Tide Tables.

Schedule of Reserved Occupations.

Ships Joining Convoys—Remission of Dues.

Summer Time.

System of Grading and Conditions of Employment of Certain Classes of Dock Employees.

War Damage to property of Dock and Harbour Authorities.

War Gifts from Overseas—Remission of Charges.

War Injuries to Personnel—Compensation.

War Risks Insurance—Dredgers.

Work after Air Raid Warnings.

Accounts

The Expenditure charged to this year's accounts amounts to £2,377 7s. 2d. of which £2,372 4s. 2d. is payable by Members of the Association. The balance of income over expenditure on the year's working amounts to £120 6s. 10d. which added to the surplus at the 31st December, 1939, of £37 1s. 9d. makes a total surplus of £157 8s. 7d.

The Future of the Port of Hamburg

A Nazi Forecast

A particularly roseate view of the future of the Port of Hamburg, notwithstanding its wholesale devastation during repeated onslaughts by the Royal Air Force, was taken by Herr de la Camp, President of the Hamburg Chamber of Industry and Commerce in a recent address. In glowing terms he prophesied a future for German commerce in which Hamburg would become the great port for Central Europe and the natural port of transit for the whole region of the Baltic Sea.

He said that the port had successfully adapted its import and export trade to war needs. After the war, business would develop in the form of planned private initiative, in which businesses would have to be carried on again in accordance with real business needs, and not, as now, by compulsory war-time administration.

A continual improvement and extension of the port's facilities would be necessary, and the extension of ocean shipping would be essential for the proper development of German foreign trade. For both industry and trade it was very important that the State and business administration should clearly realise the value and importance of the medium-sized small independent firms. The Hanseatic export merchants would retain their importance. It would be the great task of the import trade to re-establish markets which were capable of handling goods. That would require properly-trained expert staffs and adequate storage facilities. Hamburg would also want to take its share in the opening out and economic development of the colonial areas after the end of the war. All the great tasks which would face Hamburg business life could only be carried out, however, if an adequate flow of capable young men were assured, and the recruiting and training of these young men was one of the most important problems for the business community.

Swedish Port Trade in 1939

The Swedish Board of Trade have issued statistics relating to the trade at Swedish ports during 1939. The return comprises 285 ports or landing places, including the free ports of Gothenburg, Stockholm and Malmö and not treating these as separate units. The number of ports of importance is, however, small and only 13 had a total traffic (in and out) exceeding a million tons; 35 ports and places had traffic exceeding half-a-million tons. The following table shows the total inward and outward net tonnage at the 9 leading ports for the years 1938 and 1939:—

	Net Tonnage	
	1938	1939
Gothenburg	14,592,000	15,658,000
Stockholm	12,206,000	11,574,000
Malmö	8,127,000	8,842,000
Helsingborg	7,656,000	8,116,000
Trelleborg	5,167,000	5,701,000
Lulea	3,011,000	4,322,000
Oxelösund	2,679,000	3,149,000
Gefle	2,606,000	2,816,000
Norrköping	1,950,000	2,091,000

Returns of the total traffic between Sweden and foreign ports show that the total tonnage in 1939 was 7.3 per cent. in excess of that in 1938.

The free ports of Gothenburg, Stockholm and Malmö had traffic in 1939 amounting to 4,156,000 tons; 2,331,000 tons and 1,019,000 tons respectively. These figures are included in the table given above.